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FOUNDRY TRADE JOURNAL

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How Much to Melt?

Calculating the weight of metal to charge each day into a cupola is not easy, but with the present price of coke it is of increasing importance. In the last edition of the *Journal* of the *Centre Technique des Industries de la Fonderie* to reach us, this question has been the subject of an interesting article. The author takes the case of a standard iron being supplied to four casting bays. In the first bay, jar-ramming machines are employed and here about 14 cwt. of molten iron is required; in the second bay, containing manually-operated machines, 1 ton 18 cwt. is needed; the third bay, housing the big moulding machines, 3 tons 9 cwt. must be provided, whilst in the bay where the heavy hand-moulded castings are made, by calculation, a matter of 8 tons 10 cwt. is demanded. To each of these estimated weights the author adds a varying percentage for general inaccuracies—one per cent. for the first two shops and two per cent. for heavier work. A second percentage is added for ladle skulls, spillage, and the like, and in this case the lighter shops are debited with three per cent. and the heavy ones with two per cent. The calculated total weight is thus increased from 14 tons 11 cwt. to 15 tons 3 cwt. Finally, five per cent. is to be added for melting loss and two per cent. for inaccuracies in weighing, making a new grand total of 16 tons 5 cwt. On the other hand, where castings are being made for the first time, the author reports that it is necessary to make rough calculations and to allow a generous margin of safety. It is useful to have available supplementary information in the form of a table which allows rapid calculation of the weights of cylindrical runners (as a function of their diameter and length), the weight of metal in standard sizes of runner basins, and similar data.

We have no quarrel with the figures quoted in the French article, except that under similar domestic conditions we should be inclined to deduct instead of adding the two per cent. to take care of inaccuracies in weighing; experience has shown that when stocks are taken at the end of the year, they are lower than mathematically should be the case. This is due to the habit men have of giving—just as if they were selling—overweight when making up charges. This sort of error, of course, is eliminated when using tape recorders on weighing machines

What we like about the system described in the French article is, that when they assign figures to each bay, gradual reductions are made, based on experience, so as to arrive at the optimum amount to melt on any one day. Moreover, readers of the article are impressed with the need for extreme care in melting; this is not related to good costing, but to the obvious potential money-saving.

BCIRA Course on Sand Control

The interest shown by ironfounders in sand control is such that the British Cast Iron Research Association proposes to hold another of the short courses on this subject. Over 400 have attended the courses held during 1951-56; and the next one will be held at Alvechurch from Tuesday, April 9, to Friday, April 12, inclusive. The attendance will be limited to a maximum of 12, and applications will be dealt with in rotation. Should, however, the number of applications exceed 12, a further course, or courses, will be held after a short interval.

The course was originally designed for young technical men concerned with sand-testing and sand-control in the foundry, but many senior foundry foremen have also attended. Reports from members have indicated that the course has been equally useful to foremen and technicians, and men from either category are, therefore, invited.

Hotel and other accommodation in the Alvechurch area is very limited and members attending are advised to make their own arrangements in Birmingham. No fee is charged for the course itself, but those attending have to meet their expenses for transport and accommodation. The present petrol situation has made the ordinary staff coaches, which it has hitherto been possible to put at the disposal of those attending, full to the limits approved by the authorities. It is therefore proposed, as long as the petrol restrictions continue, to run a special coach from Birmingham to the laboratories and back again, the cost per place on which for the period of four days will be 33s. The cost of a mid-day meal for the four days in the staff dining room is 7s.

Technical State Scholarships

Changes in the arrangements for the award of Technical State Scholarships are announced by the Ministry of Education. In 1957, the number of scholarships to be awarded will be increased from 150 to 225. In 1958, applications will be considered only from candidates who, for the two previous years, have been engaged in part-time study at establishments for further education; except that students following national diploma courses will also be eligible; and only from students who have not proceeded beyond ordinary national certificate level, or A.1 level in higher national certificate courses; or corresponding levels in other types of course.

The effect of these changes will be to exclude from the scheme in 1958 and later years two categories of students hitherto eligible:—(*a*) students who have followed full-time courses leading to G.C.E. (advanced level). In future, such students will be expected to apply for ordinary State Scholarships and not Technical State Scholarships; and (*b*) students who have obtained higher national certificates. National certificate students will require to decide at the ordinary national certificate stage, or at latest at the A.1 stage, whether they wish to enter for a Technical State Scholarship.

Latest Foundry Statistics

According to the Ministry of Supply, the output of aluminium castings during December, 1956, was 1,531 tons from sand moulds, 2,990 tons as gravity-die and 1,206 tons as pressure-die-castings. The cumulative totals for 1956 were respectively 21,735; 42,157; and 14,672 tons. The magnesium castings production during December was 192 tons, and for last year it was 3,384 tons.

Correspondence

"HOT" COOLING OF TUYERES

To the Editor of the FOUNDRY TRADE JOURNAL.

SIR,—The article "'Hot' Cooling of Tuyeres" in your issue of February 14 mentions the possibility of extending this development to the application on foundry cupolas. You may be interested to know that a hot-cooling system developed by Strico/Cupodel in co-operation with a German firm of boiler manufacturers has already been successfully in operation for more than a year at an experimental cupola of 28-in. inside diameter. Basing on the experience gathered at this plant, the same company applied the system in 1956 to a hot-blast cupola premelting plant for a German steelworks, where each of three cupolas of 79-in. well-diameter supplies 30 tons of metal per hour to the open-hearth furnaces. Two of the cupolas are in continuous operation at a time. To begin with, one such cupola was equipped with the hot-cooling system which, at 42 atmospheres pressure, develops saturated steam of 250 deg. C. The steam is then superheated to 420 deg. C. by the use of cupola waste gases and is fed into the work's grid. The water consumption in this cooling system is approximately $\frac{1}{15}$ of that in conventional cooling systems for plants of comparable size. The results obtained in eight month's campaign with the first cupola thus equipped have proved to be successful, so that the remaining two cupolas are now being converted also to incorporate the hot-cooling system—yours faithfully,

E. LOBBECKE.

C/o Strico G.m.b.h. Gummersbach, Germany.
March 7, 1957.

Dinners

AGA Agents

The annual AGA agents dinner was held last week at the Dorchester Hotel, Park Lane, London, W.1., with Mr. Vincent Jobson, chairman of AGA Heat, Limited, presiding. The speeches were delivered by Mr. H. A. Warner (Ipswich); Mr. G. Savile Steven (Newport); Mr. P. S. Green (also of Newport); Mr. Charles Insch, and Sir Frederick Burrows, G.C.S.I., G.C.I.E., D.L. After the toasts had been duly honoured, the company was entertained by Tonia Bern, and Al Koran.

Keighley Association of Engineers

The 57th annual dinner of the Keighley Association of Engineers was held at the Mechanics' Institute, on March 9, Mr. D. O. Rushton presiding. The speakers were Professor Asa Briggs, Mr. J. E. Hill, and the Mayor of Keighley (Alderman J. A. Taylor).

"The Younger Generation" at F. H. Lloyd's

Young Alan Harris, a 20-year-old foundry apprentice with F. H. Lloyd & Company, Limited, broadcast on the "Younger Generation" B.B.C. programme as compere on December 14. Subsequently, he did a second broadcast on the arrangements made for the World Jamboree of Boy Scouts to be held this year at Sutton Coldfield, Staffs. Preparations were completed last week for Charles Thompson, foundry apprentice, and his father, George Thompson (both employees of Lloyd's) to join forces with Alan Harris on the 200th programme of the "Younger Generation Parade" which is being broadcast this evening.

The Carbon-dioxide Process of Mould and Core Production*

By G. E. Parramore, A.I.M.

Since the carbon-dioxide process for hardening moulds and cores was first introduced to this country, considerable progress has been made in its application to both ferrous and non-ferrous founding and in many foundries it is superseding conventional methods of hardening. Experience shows that it can be used in the production of many castings, which formerly were produced by loam or dry-sand methods, and in certain cases the accuracy obtained has been found equal to that produced by shell moulding. All difficulties relating to the process have not been overcome, and further work is necessary before it can be used for every class of work. The process is being successfully used in the production of a wide variety of castings and the present paper outlines the progress already made and the simplicity of equipment and techniques required. Briefly, the process consists of taking a suitable sand, mixing it with a sodium silicate based binder, ramming to shape and hardening by diffusion of carbon-dioxide gas through the sand mass.

The use of sodium silicate as a binding agent for foundry sands is not new and in the past several attempts have been made to use it for this purpose. With one exception, all the earlier attempts were based on the use of straight sodium silicate/sand mixtures which were allowed to air-harden after mould and core making. In this case, the silicate/sand mixture was simply dried to a hydrated form without appreciable decomposition taking place. In the present process a definite chemical reaction occurs which results in the formation of sodium carbonate and silica gel, the gel bonds the grains of sand together giving a strong permeable and compact mass suitable for use as cores, moulds or mould facings.

History of the Process

The process was referred to in an English Patent obtained by Hargreaves and Poulson in 1898 but unfortunately it appears to have attracted little attention in industry. The application of the process on a practical basis appears to have originated in Russia and other Eastern European countries and in the years 1952, 1953 a number of papers were published by Russian and Czechoslovakian authors. In 1953 to 1954 papers were also published in Germany, of these an excellent paper by Petrezela[1] deals comprehensively with the principles involved and puts forward a number of recommendations considered essential for the success of the process. These are:—

1. The sodium silicate addition should be between 4.0 and 6.0 per cent. by weight of the sand used. 2. In order to compensate for losses to atmosphere, etc., CO_2 consumption should be between 0.5 and 2.0 per cent. by weight of sand used. 3. A good quartz sand should be used, preferably having round, smooth grains; the grain size being fairly uniform with a maximum loam content of 2.0 per cent. 4. For grey and m lleable-iron castings, the correct initial grain-size is 0.1 to 0.2 mm. Where large moulds and cores are required, the recommended grain size is 0.2 to 0.3 mm, that for steel being 0.2 to 0.5 mm. 5. The initial moisture content should not exceed 1 per cent. 6. After one casting, the sand can be successfully used again, provided it is washed to remove sodium carbonate —without washing the hardened strength is reduced.

Syssoev[2] in a paper describing the application of the process in a Russian foundry claimed appreciable increase in the output per unit area of working space for small-capital outlay, while considerable savings are reported in a German paper[3] describing the use of the process in a light metal foundry. Schumacher[4] in a paper dealing with the application of the process in German iron and steel foundries states that cores and moulds cannot be softened after hardening since the chemical reaction involved is not reversible. Neither can cores or moulds which have become water-logged after hardening, be re-hardened by renewed exposure to CO_2—over-gassing should be avoided.

A survey of foreign literature confirms the success of the process on the continent and claims the following advantages: Elimination of stoving resulting in reduced fuel costs; increased production owing to the rapidity of the process; elimination of core carriers and reduction in number of lifters, core wires and grids required; reduced handling costs; greater dimensional accuracy resulting from hardening of cores in core boxes and moulds with patterns in position; low capital expenditure; reduced risk of "blowing" owing to higher permeability of the sand; reduced volatile content of binder and reduced fume during casting.

Sands and Additives

A wide range of British sands are being successfully used with the process, amongst these are: Congleton, Seaton Carew, Redhill, Leven Seat, Southport, Leighton Buzzard, Erith and King's Lynn. Provided the grain size is suitable and the clay content is reasonably low, the main requirement of any sand is that it should be cold; clean; dry, and free from excessive fines. If warm sand

* Paper presented last session to the Newcastle-upon-Tyne branch of the Institute of British Foundrymen. The Author is associated with the Billingham Division of Imperial Chemical Industries, Limited.

Carbon-dioxide Process

is used, a rapidly air hardening mix is produced. Atterton[7] has shown that the quantity of binder required varies with the grain size of the sand used, and that given the correct sand characteristics, a hardened compressive-strength of 200 to 300 lb. per sq. in. is obtained after gassing for about 40 sec. It has also been shown that the hardened compressive-strength increases on standing. To assist in breakdown, additions of pelleted pitch, coal dust, wood flour or other materials is frequently made to the mixture, although aluminium and copper base alloy castings are frequently produced without any additions.

Preparation and Storage

Most of the common types of core sand-mixer plant can be used, but results obtained with a muller tend to be inconsistent. The dry, clean sand together with other dry additions should be mixed for approximately 30 sec., the binder added and the whole mixed for approximately 4 min.—mixing for longer periods produces little increase in strength and serves no useful purpose. Where maximum strength is required, the sand should be free from moisture and clay, since both materials tend to reduce the hardened strength of the mixture on standing, and also lead to friability. After mixing, the sand should preferably be stored in closed bins or hoppers to prevent contact with air, surfaces likely to be exposed to the atmosphere should be protected by means of damp sacking or similar material. If these simple precautions are observed, little difficulty is experienced in storing the mixed sand for reasonable periods of time. The air hardening tendency of the sand necessitates the cleaning of all sand-mixing equipment likely to be idle for any length of time after use. After mixing, the green-strength of the sand is comparatively low, *i.e.* 0.5 to 1.5 lb. per sq. in. but this can be increased to 3.0 lb. per sq. in. by the addition of small percentages of clay or by the use of special commercial binders. Mixtures of this type are finding wide use as mould facings in the production

FIG. 1.—*Group of patterns that have been sprayed with aluminium and polished to prevent adherance of the "green" sand.*

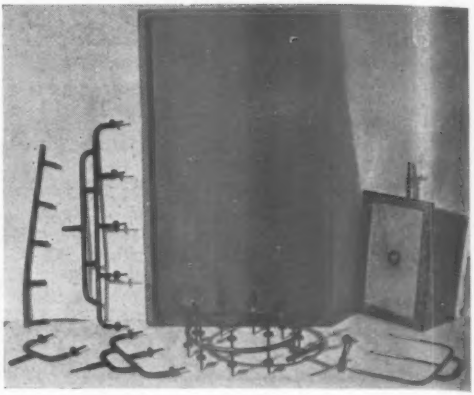


FIG. 2.—*Typical gassing equipment, including cover-plates and manifolds (rigid and flexible), normally used with the CO_2 Process.*

of medium and heavy iron-castings. The reduction in strength which occurs with small clay additions is not significant if the moulds are cast within 24 hr. of fabrication. Experience in this country has shown that to avoid surface defects, hard ramming, using a flat-ramming technique, is essential.

Pattern Equipment

Where metal-pattern equipment is used, little difficulty is experienced with stripping, but if wood patterns are used, and it is intended to harden prior to stripping, then good surface finish is essential, since surface discontinuities cause sticking when the sand hardens. Cores can be successfully produced from conventional coreboxes of suitable design or by means of strickles and frames. When large castings are to be produced from existing wood patterns, the most satisfactory procedure is to strip the pattern from the mould prior to hardening. Early experiments showed that while white-wood patterns strip without difficulty, normal pattern-varnish tends to cause the green sand to adhere to the pattern; this tendency can be eliminated, however, by the application of a coating of cellulose lacquer after varnishing. Recently, successful experiments have been carried out with wood patterns sprayed with zinc, aluminium or brass. The most satisfactory technique consists of spraying the white-wood pattern with 0.003 to 0.005 in. of zinc followed by 0.010 in. of aluminium or brass. After spraying, the metallic surface is easily polished with suitable grades of emery paper. Fig. 1 shows a typical group of completed patterns. The process is relatively cheap and well worth considering where the number of castings required necessitate surface treatment of the pattern. Tests carried out include stripping before hardening and after hardening and in both cases satisfactory results were obtained with normal times of contact. In order to check the durability of metal sprayed wooden patterns, long-term tests are

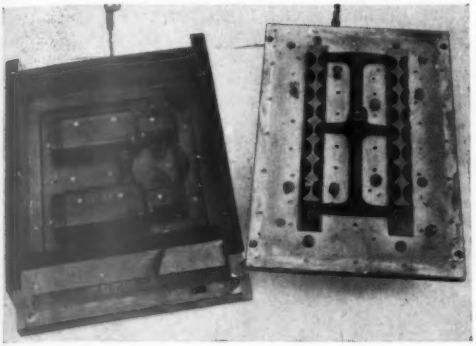


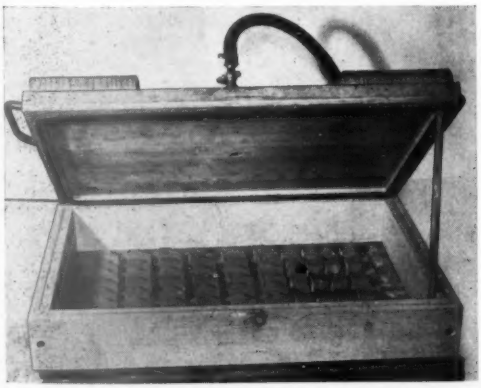
FIG. 3.—*Pattern equipment used in the production of small moulds made entirely from CO_2 sand.*

now in hand in the foundry with which the Author is connected.

Gassing Techniques

To avoid excessive gas-consumption, careful attention should be paid to all gas-supplying equipment, valves, and pipe lines, etc., and the most efficient gassing procedure should be adopted. Over-gassing, which is indicated by the appearance of white spots on the mould or core surface, should be avoided, since not only does it result in high gas consumption but also produces a friable surface which rapidly erodes under the action of molten metal. The initial reaction between CO_2 and sodium silicate occurs extremely rapidly and according to Petrezela, with a 4.0 per cent. binder addition, the theoretical quantity of gas required is approximately 0.3 per cent. by weight of sand used. Practical experience has shown that this figure is affected by losses to atmosphere and a figure of 1.0 to 2.0 per cent. is accepted as satisfactory for most applications. Where vacuum techniques are employed, it should be possible to achieve a consumption closely approximating to the theoretical value—this method is now under investigation.

FIG. 4.—*A simple cover and frame used for gassing small cores after stripping; a number of these can be seen inside the frame.*



Covers and Manifolds

Methods of introducing the gas vary from a single tube or manifold to covers, hollow patterns and patternplates. Bottom gassing appears to give the most satisfactory results and should be used wherever possible. In the production of large moulds where the moulds consist of a facing of CO_2 sand backed by green sand, gassing is carried out by the cover method after the pattern has been stripped. Fig. 2 shows typical equipment used in the gassing

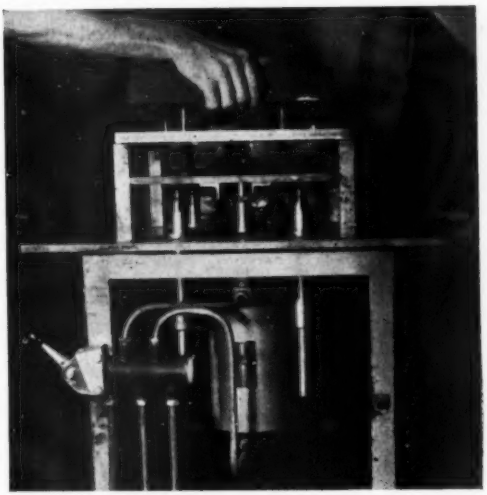


FIG. 5.—*Ejection bench operated by compressed air and used for the production of small moulds and cores.*

operation. With the exception of the flexible manifold on the left of the illustration, all manifolds have been fabricated from $\frac{5}{16}$ in. bore mild-steel tubing fitted with $\frac{1}{8}$ in. bore mild-steel nozzles. The flexible manifold, which has been developed for gassing irregular core-sections, was fabricated from $\frac{1}{4}$ in. bore polythene tubing. The high degree of flexibility obtained with this material permits easy manipulation for the gassing operation. Welding of the polythene requires little skill and is carried out using heated air or nitrogen. The covers used for the gassing of moulds faced with CO_2 sand are of simple construction and consist of a sheet of plywood or hardboard skirted by a wooden strip 1-in. wide and approximately 1 in. thick, faced with $\frac{1}{2}$ in. soft rubber. The strip thus forms a gas pocket over the mould face, permitting easy access of gas to all parts of the surface; this gas being introduced to the cover by means of a single tube or manifold. Where moulds of varying size are

Carbon-dioxide Process

produced, it is sufficient to use a single sheet of plywood large enough to cater for the largest job in hand with series of loose frames faced with rubber, the plywood being held in position by means of small weights. Fig. 3 shows pattern equipment used in the production of small moulds made entirely from CO_2 sand, the double-sided pattern plate to the right of the illustration consists of two $\frac{5}{16}$ in. thick mild steel plates separated by a $\frac{1}{16}$ in. rubber gasket approximately 1 in. wide. Gas is fed into the pocket created by the gasket and then to the mould surface by means of $\frac{5}{16}$ in. dia. core-vents spaced at approximately 3 in. centres. Early experiments with the process revealed the need for care in designing coreboxes, etc., so as to permit the ready escape of air from the sand mass; careful venting of complicated coreboxes is essential if soft spots are to be avoided. The best results are obtained by bottom gassing with the top surface of the mould exposed to the atmosphere; this permits the egress of the contained air which rises before the advancing gas. Where large numbers of small cores are to be treated, gassing is frequently effected by using the simple-cover and frame shown in Fig. 4, after the cores have been stripped from their boxes.

Mould Production

Small and medium sized moulds are frequently made entirely from CO_2 sand and hardened prior to stripping, but in heavy work the general procedure is to employ a CO_2 sand-facing, backed by green sand, and hardened by the cover method after stripping the pattern. The sand mixtures used in the production of moulds and cores shown in subsequent illustrations are as follows:

Seaton Carew—100 lb. sand with 5.0 per cent. binder and 0.5 to 1.5 per cent. pelleted pitch.

Redhill "H"—100 lb. sand with 6.0 per cent. binder; this mixture is generally employed as a facing where particularly fine finish is required.

Congleton—100 lb. sand with 3.0 per cent. binder and 1.0 to 1.5 per cent. pelleted pitch. For non-ferrous work the mixture consists of 100 lb. sand with 3 per cent. binder, 1 per cent. pelleted pitch, 1 per cent, Pulverite and 1 per cent. wood flour.

The process has been found particularly suitable for the production of moulds and cores for small castings to close tolerances, and is usually facilitated on moulding machines or with the aid of an ejection bench of the type shown in Fig. 5. The ejection plate, which is fitted with mild-steel guides mounted in brass bushes is operated by a compressed-air cylinder through a four-way valve. All plates or boards used, are fitted with $\frac{5}{16}$ in. dia. spring loaded ejection-pins and are designed for bottom gassing. A series of moulds and castings produced with the equipment are shown in Fig. 6. For casting, the moulds are stacked in piles of from four to six high. The cast-iron handwheel and nameplate moulds were produced from Seaton Carew sand while the cast-iron links and aluminium instrument panel castings were produced from Seaton Carew sand-moulds faced with Redhill "H" sand. With the exception of the instrument-panel casting, all

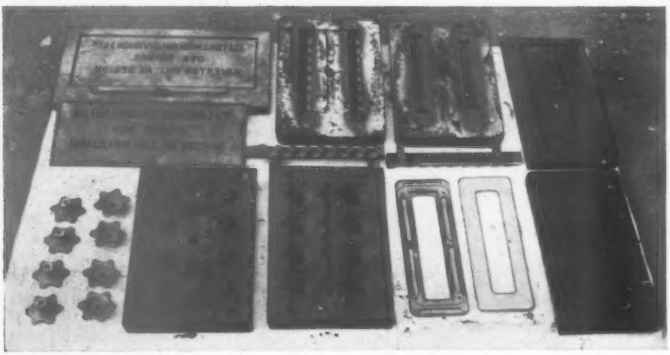


FIG. 6.—*Representative selection of moulds and castings; the moulds having been manufactured on the ejection bench shown in Fig. 5.*

FIG. 7.—*Moulds, cores and finished gunmetal hopper casting for the explosives industry. The high surface finish was obtained by utilizing Redhill "H" facing sand.*

FIG. 8.—*Modified jolt-squeeze pin-lift machine used for the production of moulds for non-ferrous valve castings.*

moulds were sprayed with an inflammable mould wash and the half-moulds which are approximately 2½ in. thick were gassed in 20 sec. using a pressure

FIG. 9.—*Moulds of Congleton sand and valve-ring castings produced. The moulds were made on the modified jolt-squeeze pin-lift machine shown in Fig.* 8.

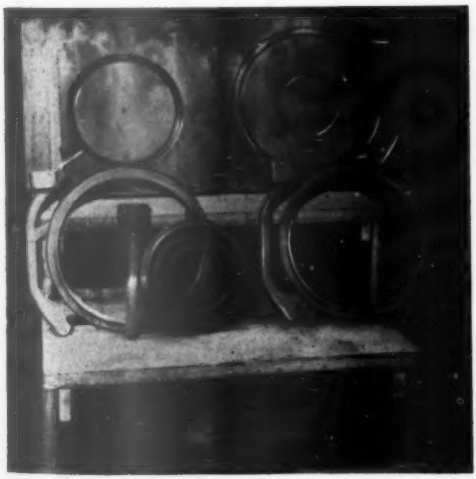


FIG. 10.—*Modified jolt-squeeze machine used for the production of cast-iron bearing blocks.*

of 25 to 30 lb. per sq. in.

Fig. 7 shows the mould, cores and finished casting of a gunmetal hopper; the excellent surface finish was achieved by employing Redhill "H" sand for the core and for the facing of the Seaton Carew mould. Various types of moulding machine have been found suitable for use with the process and Fig. 8 shows a modified jolt-squeeze pin-lift machine used in the production of moulds for non-ferrous valve-ring castings. Bottom gassing is used and the moulds, which are approximately 3 in. thick, are gassed in 20 sec. using a pressure of 20 to 30 lb. per sq. in. Typical moulds of Congleton sand and castings produced are shown in Fig. 9.

FIG. 11.—*Gassed core and lower section of the mould for a* 24*-in. dia. flanged-pipe casting* 4*-ft. long. The core is of three-inch section and required five minutes gassing at a pressure of* 25 *lb. per sq. in.*

FIGS. 12 TO 14.—*Stages in the production of a diesel-engine casing 16-ft. long.*

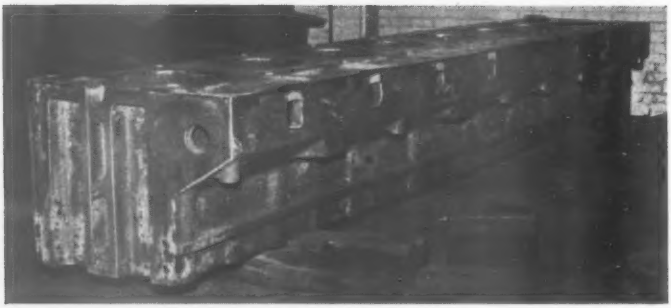


FIG. 12 (*top, left*).—*Lower section of the mould; it is faced with 1½ to 2-in. of Seaton Carew sand.*

FIG. 13 (*top, right*).—*Selection of the cores employed.*

FIG. 14 (*left*).—*Finished diesel-engine casing.*

FIG. 15 (*below*).—*Complex mould for the production of the side-frame for a printing press together with the pattern used.*

Fig. 10 shows a modified jolt-squeeze machine used in the production of moulds for cast-iron bearing blocks. The pattern and plate are fitted with core vents leading to a gas chamber located between the pattern, and the CO_2 is fed to the chamber *via* a valve on the gas line, this being automatically operated by the vibrator control shown in the photograph.

Figs. 11 to 17 illustrate the production of moulds for medium and heavy iron-castings, usually employing 1½ to 2 in. facing of Seaton Carew sand backed by green sand; the gassing operation for these moulds was carried out by the cover method, and required three to five min. with a pressure of 25 to 30 lb. per sq. in. All the moulds and cores illustrated were coated with an inflammable mould-wash applied by brushing.

One field in which the CO_2 Process appears to be producing superior results to those by conventional methods is that involving the production of iron castings with large flat surfaces; Fig. 16 illustrates the standard of finish

FIG. 16 (*left*).—*Example of the high-quality surface-finish obtained with the CO_2 Process; this is a cast-iron plate measuring approximately 7 ft. by ¼ in. section.*

obtained on a cast-iron plate approximately 7 ft. long by ¼ in. thick. Excellent results have also been obtained on plates up to 8 ft. dia. and two to three in. thick formerly produced by loam methods.

(*To be continued*)

REFERENCES.

[1] Petrezela, L., *Hutnicke Listy*, 1952, **7**, 514-518, 575-585.
[2] Syssoev, C. I., *Litinoe Prozvodstro*, 1952, **1**, 5.
[3] *Giesserei Praxis*, 1954, **72**, 117-118.
[4] Schumacher, W., *American Foundryman*, Sept. 1954, 46-49.

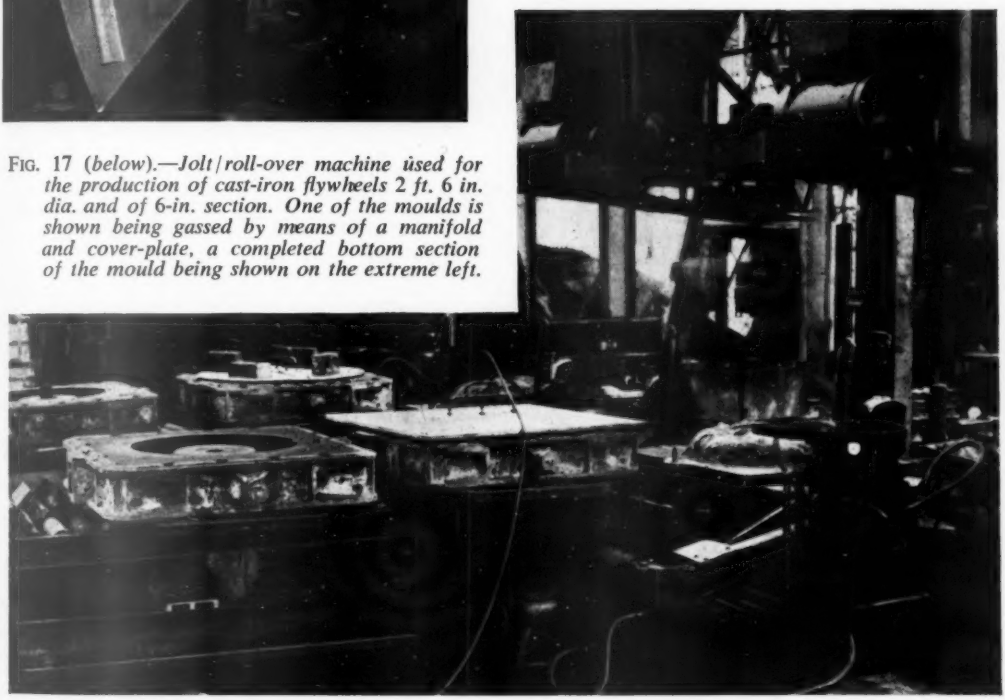


FIG. 17 (*below*).—*Jolt/roll-over machine used for the production of cast-iron flywheels 2 ft. 6 in. dia. and of 6-in. section. One of the moulds is shown being gassed by means of a manifold and cover-plate, a completed bottom section of the mould being shown on the extreme left.*

AN APPEAL TO MEMBERS to cease the "insane price cutting" policy in the scramble for work owing to the falling demands of the motor industry was made by Mr. R. Bennett, president, at last week's annual meeting of the National Association of Drop Forgers and Stampers, in Birmingham. Since the demands for motor forgings had fallen off some very "silly prices" were being offered. The Association could do nothing more than continue to make its members aware of that insane price cutting, and recommend them to base all their estimates on sound practice. Developments since a year ago, when the industry was still enjoying its post-war prosperity, had brought much stress and strain to the drop-forger.

VISITORS to the International Spring Fair, which opened in Leipzig this week, are having a preview of one of the underfloor diesel-engined buses which Britain is supplying to Poland. The bus, a luxury model, which is being exhibited on the stand of Leyland Motors, Limited, is one of an order for five luxury buses and ten inter-city buses which was placed with the company despite strong competition from Germany and France. Other exhibits on the stand include a 100-h.p. Comet cruiserweight diesel-truck; a working model of the powerful 900-cub. in. Leyland-Albion diesel-engine, and a model which demonstrates the easy working of Scammell automatic coupling gear used with tractors and semi-trailers.

Ironfounding Output Maintained in 1956

As announced in the JOURNAL last week, the production of iron castings in 1956 at 3,899,000 tons compares with the record 1955 output of 3,925,000 tons—a reduction of approximately ¼ per cent. In the fourth quarter of 1956 it was approximately 6½ per cent. less than that reached in the fourth quarter of 1955. After record output achievements in the first and second quarters of the year the industry's output eased slightly in the third quarter. The continuing difficulties in the motor industry, together with the general effects of the closure of the Suez Canal, have led to a setback in the last quarter of the year (973,510 tons).

Main Sections

Table I shows the output of iron castings in the fourth quarter, and in the year 1956, for each of the six main sections of the ironfoundry industry compared with the corresponding periods in 1955:—

TABLE I.—*Output of Iron Castings, by Sections.*

Section (Grey and malleable iron castings).	Tons.				1956 Percentage change on corresponding periods of 1955.	
	1955.		1956.			
	Jan. to Dec.	Oct. to Dec.	Jan. to Dec.	Oct. to Dec.	Jan. to Dec.	Oct. to Dec.
Ingot moulds	378.2	107.2	429.7	111.1	+13.6	+ 3.6
Automobile (including tractors)	539.2	145.9	463.0	106.7	−14.1	−26.9
Engineering	1,447.6	381.6	1,448.3	361.3	0.0	− 5.3
Building and domestic	578.6	151.9	560.5	149.5	− 3.1	− 1.6
Pressure pipes and malleable tube-fittings	702.6	183.0	684.3	157.3	− 2.6	−14.1
Railway equipment	278.9	71.1	313.4	87.6	+12.4	+23.2
Total	3,925.1	1,040.7	3,899.2	973.5	− 0.7	− 6.5

Only in the ingot mould and railway equipment sections was output for the fourth quarter of the year greater than in the fourth quarter of 1955, though in the building and domestic section the shortfall was hardly significant. For the year as a whole the largest section by weight—the engineering section—easily maintained the 1955 output, while small reductions in the building and domestic and pressure-pipe sections were more than offset by gains in the railway equipment and ingot mould sections. The automobile section, however, shows a large fall in output for the year, the reduction being greater in the last quarter.

Raw Materials

The ironfounding industry's consumption of its principal raw materials is shown in Table II.

TABLE II.—*Pig-iron and Scrap Consumption by Foundries.*

	Tons.		Percentage decrease.
	1955. Fourth quarter.	1956. Fourth quarter.	
Pig-iron (including refined iron)	657,400	583,800	11.2
Iron and steel scrap (about half is foundry circulating scrap)	830,000	790,800	4.7

The number employed in the ironfounding industry at December 29 was 140,258—a reduction of 4 per cent. in the labour force from the level of 146,103 which obtained at the end of December, 1955.

Gloucester Foundry's Difficulties

£16,000 *Already Spent on Reducing Smoke*

Although the Gloucester Foundry, Limited, have spent £16,000 in the past six years in attempts to cure the nuisance caused by the emission of soot and grit from the Emlyn Works in Alfred Street, the problem is still causing the company considerable concern.

Residents in the area of the foundry complain that the smoke is damaging paintwork and gardens of their properties; that they can only put their washing out to dry on Sundays, and that windows have to be permanently shut. Recently, they sent a deputation to Mr. M. Turner-Samuels, Member of Parliament for Gloucester, to seek his aid, and after his comments had been considered at the last meeting of the City Council it was decided to place the facts before appropriate experts with a view to the service of an abatement notice on the firm in regard to the smoke emission.

Councillor A. V. Stirland, opposing this suggestion, said it seemed to him that some sort of persecution of the Gloucester Foundry was taking place and he was not at all happy about it. "This particular foundry," he said, "is in an industrial area and anyone who is in an industrial area cannot expect to have the same amenities as are enjoyed in residential areas."

Councillor Frank Phelps voiced the feelings of the supporters of the resolution and said the nuisance caused to residents by industrialists in the city was getting worse. That was why the Council in its new development plan was zoning off its industrial areas.

Remedial Measures Applied

On Monday of last week, Mr. F. Butler, the general manager of the foundry, and Mr. P. Bulteel, secretary and commercial manager, explained the many steps which had been taken to meet the complaints. These, they said, were based on two main points—the emission of smoke from the stack and the grit and ash from the cupola furnace. £16,000 had been spent by the company on remedial measures in the last six years; the grade of oil used had been changed to a more expensive one, which was costing the company £1,000 a year more on operating costs alone. The annealing furnaces had all been changed to oil firing at a cost of £8,000, and £6,000 had been spent on the best known means of preventing the grit and ash from leaving the cupolas. (The firm has installed a wet dust and grit arrestor made by T. H. & J. Daniels, Limited, mechanical and hydraulic engineers, of Stroud, near Gloucester.) Many other devices to prevent the grit being emitted had also been installed.

Mr. Bulteel pointed out that the foundry was on the site before the houses were built and the area had been officially declared an industrial one. "We are doing our utmost to prevent the trouble and shall continue to do so, although all the money spent on it will not bring one penny piece of profit into the firm," he added.

AT A MEETING of the Midland Regional Board for Industry last month, Mr. J. W. Eldridge, Regional Controller for the Ministry of Labour, said that the number on the unemployment register for February will be up again but the increase, about 2,000, will be nothing near so great as it was between December and January. He also reported a fall of between 2,000 and 3,000 in the number of Midland workers on short time. Major C. R. Dibben, chairman of the Board, said that apart from the motor trade the general industrial position was encouragingly optimistic.

Fifty-fourth IBF Annual Conference

Detailed Arrangements for the Harrogate Meeting, June 18 to 21

The fifty-fourth annual conference of the Institute of British Foundrymen is to be held at Harrogate from June 18 to 21, inclusive. This year, the conference is being organized by the West Riding of Yorkshire branch of the Institute, and Mr. J. Blakiston, M.I.MECH.E., M.I.PROD.E., a past-president of that branch, will be installed in the office of president of the Institute during the conference. Harrogate is one of Britain's most famous inland resorts and one of the most beautiful towns in the country, as the illustrations included on these pages show. It provides an ideal setting for a conference, with its comfortable hotels (see plan, Fig. 1), excellent meeting accommodation, and central position, offering easy access to the foundry centres which will be visited. Harrogate's shopping facilities and artistic displays are unrivalled, and its geographical situation as the gateway to the Yorkshire dales and the many beauty spots and places of historical interest in the surrounding area, make it also an attractive centre for the ladies.

Conference Office.—The conference office will be

FIG. 1.—*Plan of the centre of Harrogate showing the main public buildings and principal hotels (the conference headquarters is at the Hotel Majestic).*

Key: (1) Railway Station; (2) Bus Station; (3) Information Bureau and Lounge Hall; (4) Royal Pump Room Museum; (5) Royal Baths; (6) Royal Hall; (7) Sun Pavilion; (8) Library and Art Gallery; (9) Gaumont Cinema; (10) Regal Cinema; (11) St. James Cinema; (12) Odeon Cinema; (13) General Post Office; (14) Car Parks (Valley Drive and Belvedere); (15) Swimming Baths; (16) Tennis Courts (Valley Gardens and Royal Hall Gardens). *Hotels:* (A) Adelphi; (B) Beechwood; (C) Cairn Hydro; (D) Grand; (E) Grange; (F) Green Park; (G) Kensington; (H) Kirksyde; (I) Langham; (J) Majestic; (K) Old Swan; (L) Prince of Wales; (M) Prospect; (N) Russell; (O) St. George; (P) Valley Gardens.

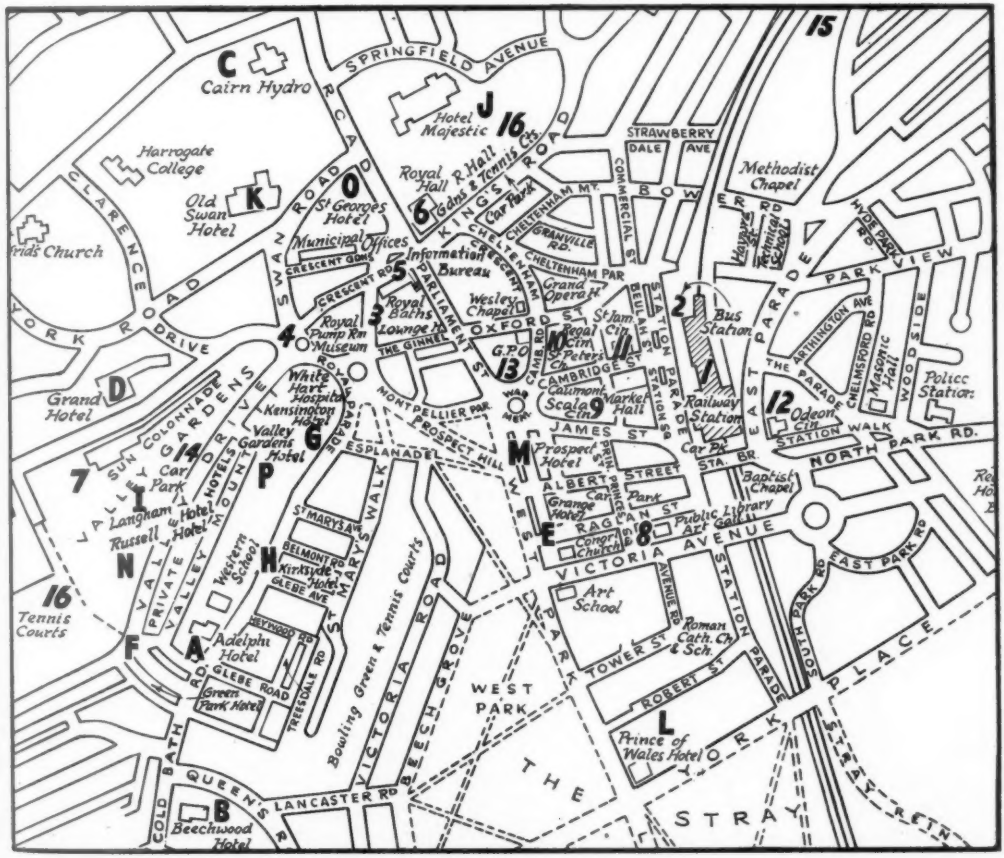

SPRINGFIELD AVENUE
Cairn Hydro
Hotel Majestic
Harrogate College
Old Swan Hotel
St George's Hotel
Municipal Offices
Information Bureau
Royal Hall (Gdns & Tennis Ct)
Car Park
KINGS ROAD
STRAWBERRY DALE AVE
Methodist Chapel
CLARENCE ROAD
SWAN ROAD
YORK ROAD DRIVE
CRESCENT GDNS
CRESCENT RD
PARLIAMENT ST
Royal Baths
Royal Pump Rm Museum
Wesley Chapel
Grand Opera H
OXFORD ST
THE GINNEL
G.P.O
CAMBRIDGE ST
Regal Cin
St James Cin
St Peters Ch
STATION PARADE
Bus Station
Railway Station
Odeon Cin
Masonic Hall
Police Station
PARK VIEW
WOODSIDE
ARTHINGTON AVE
HELMSFORD RD
Grand Hotel
White Hart Hospital
Kensington Hotel
Valley Gardens Hotel
Caumont Scala Cin
Market Hall
JAMES ST
NORTH PARK RD.
STATION WALK
Car Pk
MONTPELLIER PAR
PROSPECT HILL
ESPLANADE
Prospect Hotel
ALBERT STREET
Grange Hotel
Car Park
Baptist Chapel
Public Library & Art Gallery
VICTORIA AVENUE
Congr Church
Art School
Roman Cath. Ch & Sch
EAST PARK RD
SOUTH PARK RD
PARK PLACE
TOWER ST
ROBERT ST
Prince of Wales Hotel
WEST PARK
THE STRAY
YORK PLACE
ST MARYS WALK
ST MARYS AVE
BELMONT RD
Kirksyde Hotel
GLEBE AVE
Western School
Langham Hotel
Russell Hotel
PRIVATE HOTELS ASSOCIATION
VALLEY DRIVE
SUN COLONNADES
Car Park
Tennis Courts
Adelphi Hotel
HEYWOOD RD
GLEBE ROAD
TREESDALE RD
Green Park Hotel
Bowling Green & Tennis Courts
VICTORIA ROAD
BEECH GROVE
COLD BATH RD
QUEENS RD
LANCASTER RD
Beechwood Hotel
Trinity Church
COMMERCIAL ST
GRANVILLE RD
CHELTENHAM MT
CHELTENHAM CRESCENT
CHELTENHAM PAR
BEULAH ST
STATION PARADE
EAST PARADE
WIDE LANE
Technical School
Library
Public Baths
Car Park
Car Park
Car Park

FIG. 2.—*The sun pavilion shown in Fig. 3 can be seen (bottom left) in this aerial view of the Valley Gardens.*

established on Tuesday, June 18, on the ground floor of the Hotel Majestic, Harrogate, and direction cards will indicate its location. Communications prior to this date should be addressed to the head office of the Institute, St. John Street Chambers, Deansgate, Manchester 3.

Programme

Tuesday, June 18:

Afternoon: Council and committee meetings in the Ballroom of the Hotel Majestic. Open to Council and committee members only, who will receive particulars later. Members and ladies make their own arrangements for luncheon and dinner.

8.30 p.m. to 12 p.m.: Reception by the Mayor of Harrogate and the Mayoress at the Royal Hall. The reception to be followed by dancing, cabaret and refreshments. (Members and ladies; evening dress optional.)

Wednesday, June 19:

9.15 a.m.: Annual general meeting in the Conference Hall of the Hotel Majestic (members only). Presentation of awards.

10.45 a.m.: Adjourn for coffee in the Winter Gardens and Drawing Room of the Hotel Majestic (members, invitation).

11 a.m.: Presidential address by J. Blakiston, M.I.MECH.E., M.I.PROD.E.

11.30 a.m.: Edward Williams Lecture entitled "Thoughts on the Future of the Ironfoundry Industry," by Sir Frederick Scopes.

12.45 p.m. for 1 p.m.: Luncheon at the Hotel Majestic (members and ladies) (by invitation of the West Riding of Yorkshire branch).

2.30 p.m.: Technical sessions at the Hotel Majestic.

5 p.m.: Conference adjourns. Buffet tea in the Winter Gardens and Drawing Room of the Hotel Majestic (members, invitation).

7 p.m.: Reception at the Hotel Majestic by the president and Mrs. Blakiston (evening dress).

7.30 p.m. to 1 a.m.: Annual banquet in the Hotel Majestic, followed by dancing (members, ladies and guests; evening dress.

Thursday, June 20:

9.30 a.m.: Technical sessions at the Hotel Majestic.

10.45 a.m.: Adjourn for coffee (members, invitation).

12.45 p.m. for 1 p.m.: Luncheon at the Hotel Majestic (members).

2.30 p.m.: Technical sessions at the Hotel Majestic.

5 p.m.: Conference adjourns. Buffet tea (by invitation).

Evening Entertainments.—Motor coaches leave from the Cocktail Bar entrance (on Ripon Road) of the Hotel Majestic, on the following excursions:—Fountains Abbey or Newby Hall. Buffet supper on return at the Hotel Majestic (members and ladies).

Works Visits

Friday, June 21:

Members will take part in one only of the following visits or groups of visits. Depart by motor coach from the Cocktail Bar entrance (on Ripon Road) of the Hotel Majestic, for:—

9 a.m.: (1) Morning: (*a*) J. Blakeborough & Sons, Limited, Brighouse (engineers and valve makers. Iron, meehanite and brass founders); luncheon by kind invitation of J. Blakeborough & Sons, Limited. Afternoon: (*b*) E. Green & Son, Limited, Wakefield (manufacturers of fuel economizers, air preheaters, etc. Grey-iron founders; mechanized and shell-moulding plant); tea by kind invitation of E. Green & Son, Limited, or

9.5 a.m.: (2) Morning: (*a*) West Yorkshire Foundries, Limited, Leeds, 12 (light-alloy and iron castings); luncheon by kind invitation of West Yorkshire Foundries, Limited. Afternoon: (*b*) Wilsons & Mathiesons, Limited, Leeds, 12 (iron-founders and gas-stove makers); tea by kind invitation of Wilsons & Mathiesons, Limited, or

9.10 a.m.: (3) Morning: (*a*) Catton & Company, Limited, Leeds, 10 (alloy and carbon-steel castings up to 4 tons); luncheon by kind invitation of Catton & Company, Limited. Afternoon: (*b*) Hopkinsons, Limited, Huddersfield (engineers; valve and boiler mounting manufacturers; brass, bronze, iron and steel founders); tea by kind invitation of Hopkinsons, Limited, or

9.15 a.m.: (4) Morning: (*a*) Hepworth & Grandage, Limited, Bradford (manufacturers of pistons,

piston rings, gudgeon pins, cylinder liners, etc.); luncheon by kind invitation of Hepworth & Grandage, Limited. Afternoon (*b*) English Electric Company, Limited, Bradford (ironfounders, meehanite licensees); tea by kind invitation of English Electric Company, Limited, or

9.20 a.m.: (5) (All-day). Wm. Asquith, Limited, Halifax and Modern Foundries, Limited, Halifax (machine-tool manufacturers; ironfounders up to 30 tons; high duty grey-iron castings); luncheon and tea by kind invitation of the above companies.

8 p.m. to 1 p.m.: Dinner/dance and cabaret at the Hotel Majestic (members and ladies; evening dress optional).

Ladies' Programme

Tuesday, June 18:

4 p.m.: Afternoon tea and informal reception by Mrs. J. Blakiston and Mrs. H. J. V. Williams in the Drawing Room of the Hotel Majestic.

8.30 p.m. to 12 p.m.: Reception by the Mayor and Mayoress of Harrogate at the Royal Hall. Reception followed by dancing, cabaret and refreshments (members and ladies; evening dress optional).

Wednesday, June 19:

10.30 a.m.: Demonstration of floral arrangements by the Countess of Bandon at the Lounge Hall, Parliament Street, Harrogate (coffee by invitation).

12.45 p.m. for 1 p.m.: Luncheon at the Hotel Majestic (members and ladies) (by kind invitation of the West Riding of Yorkshire branch).

2.30 p.m.: Ladies leave by motor coach from the Cocktail Bar entrance (on Ripon Road) of the Hotel Majestic, for:—A guided tour of Harewood House, Tea at the Old Swan Hotel, Harrogate, at 5 p.m.

7 p.m.: Reception by the president and Mrs. Blakiston at the Hotel Majestic (members, ladies and official guests; evening dress).

7.30 p.m. to 1 a.m.: Annual banquet at the Hotel Majestic, followed by dancing (members, ladies and official guests; evening dress).

Thursday, June 20:

10.30 a.m.: Coffee, and Café Concert in the Lounge Hall, Parliament Street, Harrogate.

11.45 a.m.: Ladies leave by motor coach from the main entrance of the Royal Baths in Crescent Road, Harrogate, on ONE only of the following visits:—

(1) Wormalds & Walker, Limited, Blanket Mills, Dewsbury. Luncheon at Reid's (Caterers), Limited, Prospect Hall, Cleckheaton; return Harrogate approximately 5.30 p.m.;

(2) Temple Newsam House, Leeds—a Tudor/Jacobean mansion housing old English furniture as well as pictures, ceramics and all manner of decorative arts. Luncheon at Great Northern Hotel, Leeds; return Harrogate approximately 5.30 p.m.; and (3) Lister & Company, Limited (combers, spinners, manufacturers, dyers and finishers), Manningham Mills, Bradford. Luncheon at the Victoria Hotel, Bridge Street, Bradford; return to Harrogate approximately 5.30 p.m. (For ladies' evening entertainments: see general programme.)

Friday, June 21:

Ladies leave by coach from the Cocktail Bar entrance, on Ripon Road, of the Hotel Majestic on ONE only of the following visits:—

9.25 a.m.: (1) Visit to the chocolate factory of Rowntree & Company, Limited (arrive Rowntree's about 10.15 a.m.). Luncheon at the Royal Station Hotel, York, at 12.30 for 12.45 p.m.; proceed by coach to the York Castle Museum at 2.15 p.m. Leave on return from the Museum to Harrogate at 4 p.m.; arriving Harrogate at 5 p.m., or

9.30 a.m.: (2) Visit to York Castle Museum; halt *en route* for coffee at the Royal Station Hotel, York, at 10.15 a.m.; visit to Museum, 10.45 a.m.; return to Royal Station Hotel for luncheon, 12.30 for 12.45 p.m. Afternoon free to visit York Minster or shops. Leave on return from Royal Station Hotel, York, for Harrogate, at 4 p.m.; arriving at 5 p.m.

8 p.m. to 1 a.m.: Dinner/dance and cabaret at the Hotel Majestic (members and ladies; evening dress optional).

Special Note

On Saturday, June 22, members of the West Riding of Yorkshire branch will be prepared to take members and ladies staying in Harrogate for an unorganized tour to Scarborough and Whitby. If a sufficient number is interested, a coach party could be arranged.

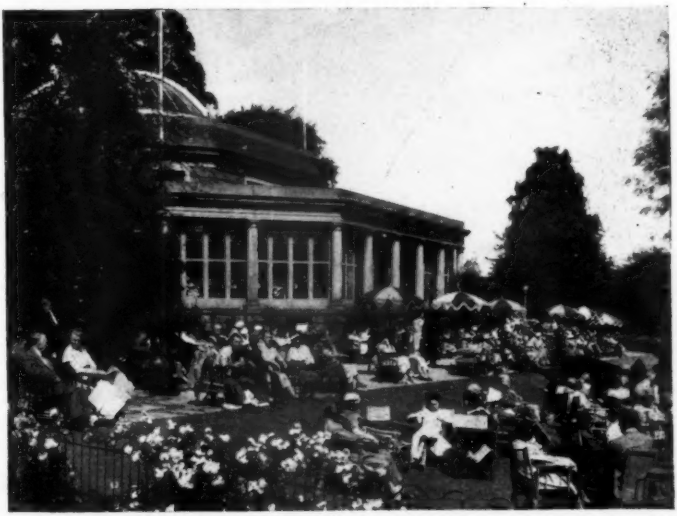


FIG. 3.—*The Sun Pavilion in the Valley Gardens.*

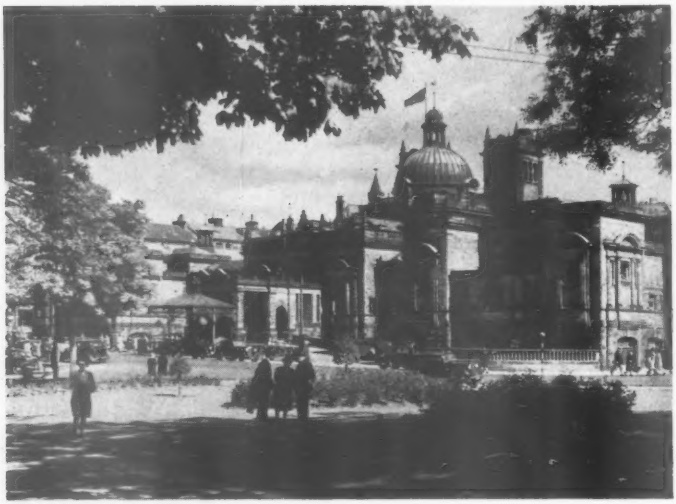


FIG. 4.—*The Royal Baths, Harrogate, situated in the centre of the town near the junction of King's Road and Parliament Street.*

Technical Papers

Wednesday, June 19:

2.30 p.m. to 5 p.m. Two simultaneous sessions.

Session A (Conference Hall, Hotel Majestic):—Paper No. 1176, "Production Problems in the Manufacture of Alloy-iron Castings," by W. Martin Lord (member); No. 1177, "Machine-tool Castings," by G. W. Nicholls (member); No. 1178, "Aids to Production in the Jobbing Foundry," by I. Rees (associate member) and D. H. Snelson (associate member).

Session B (Reading Room, Hotel Majestic):—Paper No. 1179, "Metal Losses in Crucible Melting Practice," by R. S. Jackson, B.SC., A.R.S.M., and D. W. Brown, B.SC., F.I.M. (member) (British Non-Ferrous Metals Research Association paper); No. 1180 "Observations on the Melting and Casting of Aluminium-bronze Alloys, with Special Reference to Test-bars," by C. V. Wilson, B.MET., A.I.M., and E. V. Tull, B.SC., M.SC., PH.D.

Thursday, June 20:

9.30 a.m. to 12.30 p.m.: Two simultaneous sessions:

Session C (Conference Hall, Hotel Majestic):—Paper No. 1181, "Maintenance of Foundry Plant," by L. R. Evans, M.I.MECH.E. (member) and P. W. Pegg; No. 1182, "Cupola Developments" (report of sub-committee T.S.43 of the IBF Technical Council); No. 1183, "The Hot-blast Cupola as an Economic Unit for Producing Castings to B.S.1452, Grade 12," by J. Henderson (member).

Session D (Reading Room, Hotel Majestic):—Paper No. 1184, "Surface Sinking Defects in Grey-iron Light Castings," by I. C. H. Hughes (associate member). (British Cast Iron Research Association paper); No. 1185, "Cast-iron Tests and Specifications" (report of sub-committee T.S.37 of the IBF Technical Council).

2.30 p.m. to 5 p.m. Two simultaneous sessions:

Session E (Conference Hall, Hotel Majestic):—Paper No. 1186, "Injection Processes in American Foundries," by G. P. Dahm and C. E. Bieniosek (exchange paper from the American Foundrymen's Society); No. 1187, "Mould Drying" (report of sub-committee T.S.39 of the IBF Technical Council); No. 1188, "Utilization of Oil Fuel in Foundries," by L. Marsden.

Session F (Reading Room, Hotel Majestic):—Paper No. 1189, "Features of the Metallurgical Properties of Steel Castings," by W. J. Jackson, M.SC., A.R.I.C., A.I.M. (British Steel Castings Research Association paper); No. 1190, "Heterogeneous Distribution of Oxygen in Cast Iron," by G. Blanc and M. Blondel (exchange paper from *l'Association Technique de Fonderie*).

Applications for hotel accommodation should be made as soon as possible direct to the hotel (see Fig. 1) and not to the Institute, and in all cases the name of the Institute should be mentioned; it is desirable that all hotel accommodation be booked before May 18. A large proportion of the accommodation available consists of double- and twin-bedded rooms, and members who can share rooms with others, therefore, will assist greatly by doing so. The last date for receiving conference reply-forms (at the Manchester office of the Institute) is May 18.

"Industrial Enquiry"

Mr. E. T. Sara, commercial research manager of the United Steel Companies, Limited, Sheffield, Mr. F. Whitehouse, general works manager of the engineering division of Newton Chambers & Company, Limited, Thorncliffe, and Mr. George Elliot, works manager (iron) of the Appleby Frodingham Steel Company, took part in a BBC Northern broadcast on Thursday, March 7, in a series on "Industrial Enquiry."

Mr. Sara discussed the sources of the £700,000,000 capital investment expected to be required by the industry in the next five or six years. He said that steel companies must either get it from their own resources or borrow it from outside. Speaking of the price of steel, he said that it was lower in Britain than in other steel-making countries, and could go up "without making us uncompetitive."

Mr. Whitehouse spoke on supply problems and their repercussions, and Mr. Elliot spoke of the high blowing-rates achieved in the blast-furnace at Scunthorpe. Answering a question about the risk involved in blowing a furnace at above normal rates, he said, "We take calculated risks every day; in fact, I sometimes think the whole of a blast-furnaceman's life is a calculated risk. An ironworks is a big plant, but unless at times we use it as if it were a laboratory, we shall never make anything. So long as the experiments are successful 51 times out of 100 we are justified in continuing the work.

Carntyne Adopt Electric Melting

Two Arc Furnaces Installed by Birlec

The Carntyne Steel Castings Company, Limited, of Renfrew, Scotland, have replaced the Tropenas* (side-blown converter) process of steelmaking by the installation of two basic-lined electric-arc furnaces by Birlec, Limited, shown in operation in Fig. 1. It is claimed that improvements in the quality of the steel is being obtained, together with economy in production and added facilities for the production of alloy steels. With five heats per 12 hr., and an average charge weight of 4.5 tons—an increase of 29 per cent. above the nominal capacity—the two furnaces are producing an average of 220 tons per 60-hr. week. Power consumption is in the order of 620 kwh. per ton of steel produced and electrode wear approximately 9.5 lb. per ton. The basic linings withstand 120-130 heats and the roof life is quoted at 100-120 heats.

The sulphur content of the steel produced by these basic furnaces averages 0.012 per cent. and phosphorus 0.023 per cent.; the final fully-annealed castings, having a carbon of 0.2 per cent. and manganese 0.8 per cent., give an ultimate tensile stress of 30.4 tons per sq. in. and 42 per cent. elongation with a 61.5 per cent. reduction in area on a 2-in., gauge length. The installation of these furnaces has simplified the production of low-alloy steels which was formerly difficult or impossible to arrange.

*In the Tropenas process, steel for castings is made in a small, side-blown converter. The iron is first melted in a cupola and after desulphurization is transferred to the converter. Alloying materials are added and air is blown into the vessel, impinging on the surface of the metal. A high temperature is produced in the metal by the resulting chemical reactions (mainly combustion of Si, C, P, etc.). With arc melting only the one furnace is used.

Austrian Metallographic Developments

An illustrated lecture and conversazione was recently held at the Austrian Institute, Rutland Gate, London, S.W.7; the lecture being presented by Professor R. Mitsche, of the Leoben School of Mines.

In his opening remarks, Prof. Mitsche extended his grateful thanks to those attending, and to those who had enabled him to visit the UK universities and colleges. He then gave a résumé of the development of metallography in Austria. He stated that the UK was far in advance of most other countries in this field; however, progress was now very rapid in his own country, from an educational, research and industrial viewpoint. He felt that the biggest handicap was the fact that optical developments had not been as rapid as was hoped. Continuing, he gave details of various microscope equipments that had been developed in Austria, using slides for illustration. He dealt, at length, with the development of the closed-circuit T.V. used for reproducing images from microscopes; as he pointed out, this method is in considerable use for educational purposes, permitting an unlimited number of students. The lecture was terminated by an excellent film taken during the formation of martensite from saturated austenite at the temperature of liquid oxygen. The film well demonstrated the possibilities that this method of microscopy enjoys in the research field. The meeting concluded with a conversazione, held in the Institute's library; equipment on display included: The Reichert universal-camera microscope (MeF) with mercury-vapour and zirconium arc-lamps; phase-contrast equipment; grain-size measuring eye-piece; interference tester; magnetic specimen holder, and the Reichert Neozet metallurgical microscope of the latest design.

FIG. 1.—*Two basic-lined electric-arc furnaces, manufactured by Birlec, Limited, in operation at the Renfrew, Scotland, works of the Carntyne Steel Castings Company, Limited. At the furnace (right) metal is being poured into a casting ladle, while the operator on the extreme left is shown removing a sample from the melt. The installation of these furnaces has effected an increased production together with a considerable simplification of the process of low-alloy metal production.*

Law Cases

Foundry to Pay Damages

An Edinburgh foundry labourer who was severely burned when white-hot metal from a casting machine cascaded over him, was awarded £1,225 damages by a jury sitting with Lord Walker in the Court of Session on March 7. The labourer, John Dewar Dickson, had sued his employers, Miller & Company, Limited, London Road Foundry, for £2,000. The firm admitted liability but maintained that the sum sued for was excessive.

Dickson said that on March 18, 1955, he was one of a squad of three men operating a casting machine. He was supervizing the pouring of molten metal, from a ladle suspended from a crane, into a revolving mould in the machine, when the metal burst out, cascaded from one of the end-plates of the mould and fell on him. The end-plate, he said, had been placed in position by another employee, D. J. Sweeney, who was fatally burned. It was later discovered that the plate had been held by only two pins and the other four were lying on the ground. It was believed that they had dropped out after the mould began to revolve or, alternatively, that Sweeney inserted only two and allowed the mould to revolve.

The accident, claimed Dickson, was caused by the fault of the defenders or, alternatively, by Sweeney, for whom they were responsible. It was the firm's duty to take reasonable care to provide a safe machine and pins which fitted accurately and held the end-plate securely in position. It was also their duty to inspect the machine at regular intervals and to replace pins which no longer fitted accurately, and to provide guards to protect their workmen from any escape of molten metal. One guard was in position at the time of the accident at the other end of the machine, and after the accident, a guard was fitted at the end from which the metal had escaped.

Dickson suffered shock and burns to the face. forearm, hands and right leg, and deep burns of his thigh and left leg. He was away from work for several months and as a result of the accident he had stiffness in his joints, and difficulty in working, particularly climbing; this condition was likely to be permanent. The jury's verdict was by a majority of nine to three.

Charging Bucket Not Properly Emptied

A verdict of "Accidental Death" was returned at a Derby inquest on February 21 on Charles William Thirkell, aged 59, a labourer at Qualcast, Limited, Derby, who died on February 13 from injuries received at work. It was said that scrap metal, which held fast in a bucket over the tipping place and then fell as the crane swung back, hit Thirkell on the head and killed him.

The crane driver was controlling the hoist lifting iron and steel into a cupola, and Thirkell was employed loading the raw metal. The crane driver said in evidence that he thought the bucket was empty after he had tipped a load. He saw Thirkell and shouted to him when he realized that some of the scrap metal had stuck and was falling out of the bucket; he went to assist Thirkell but found the scrap had fallen on him.

Moulder Injured

A Ripley moulder who received jaw and collar-bone fractures in a works accident in 1953 was awarded special agreed damages of £170, and a further £170 for personal injuries, by Mr. Justice Finnemore at Derbyshire Assizes on February 20. He was Mr. Arthur David Bates, aged 44, and he claimed damages against George Fletcher & Company, Derby. Bates, who was working with two other men as a loam moulder, said he crawled into a mould to repair it, when an iron cone which was being lifted by a crane, fell on his back breaking his jaw and collar-bone. Mr. B. Caulfield, defending, said ample equipment which the moulders could use was provided by the employers, and there was no negligence by the firm.

Cotter-pin Accident

At Sheffield County Court last month, Albert Lycett, employed as a slinger by Davy & United Engineering Company, Limited, Darnall, Sheffield, was awarded £163 5s. 11d. damages against the company.

Lycett's foot was injured when he was hit by a cotter-pin at the foundry and he was away from work for eight weeks after the accident. Judge Ernest Ould said that he was satisfied another man was negligent when he allowed the heavy cotter-pin to fall while they were working in the heavy casting bay. In law the employers were to blame for that. He found no fault in the system of work that was used and there was no evidence of contributory negligence on the part of Lycett.

Safety in the Foundry

The latest issue of the Finnish foundry journal *Konepajamies* to reach this country contains the first part of a lengthy contribution by E. Häkkinen on "Workers' Safety in the Foundry." This is summarized as follows:

Accidents per 1,000 workers in 1952 amounted to 114.2 in the metal-working industry (including foundries), and to 88.9 in the entire industry of Finland. Two main groups can be discerned among the causes of accidents: technical and human reasons. According to investigations in various countries, 15 to 25 per cent. of all accidents can be ascribed to the first-mentioned, while human factors are mainly responsible in 75 to 85 per cent. of the cases. The occurrence of accidents based on technical circumstances can be reduced efficiently with the aid of appropriate protective devices and other similar equipment. With regard to man himself, on the other hand, there is nothing to be done except enlightening and propaganda work and the institution of safety regulations. In this paper, the accident hazards due to technical conditions are subdivided as follows: raw material storage, transport of molten metal, and pouring. (The article is to be continued.)

Nuclear Machinery for a British Submarine

Vickers Nuclear Engineering, Limited, which consists of Vickers-Armstrongs, Limited, Rolls-Royce, Limited, and Foster Wheeler, Limited, is developing a propulsion unit based on a pressurized-water reactor —similar to the type of reactor used by the USS Nautilus. Rolls-Royce, Limited, are responsible for the design of the reactor and associated equipment, Foster Wheeler, Limited, the steam generators and associated equipment and Vickers-Armstrongs, Limited, the turbines, condensers and other auxiliaries. The prototype machinery will be installed in a land-based hull structure. There the machinery will be proved, and a series of tests and trials carried out; it will also be used for training personnel. The machinery is designed to give a submarine high speed with very great range and will enable it to remain submerged for long periods, as there will be no need to recharge batteries every 24 hours as in conventional submarines.

Buying that New Machine*

By a Taxation Correspondent

Most foundrymen know, of course, that indirectly the Inland Revenue will help them to pay for a new moulding or other machine, but few of them have any precise conception of the value of such aid. Furthermore, the dealer in machinery can seldom supply exact information on this point, although one would think it ought to be an essential item in his sales talk. Relatively speaking, the foundryman in charge of a small- or medium-size business will get less help from the Inland Revenue than is accorded to large concerns. This is not political favouritism as some extremists would have one suppose; it is merely due to the fact that the smaller man pays less tax, and there is, therefore, less cake for him to cut at.

Over the whole life of a machine, the Inland Revenue will allow its total cost as a deduction from profits, but if the profits are less than £2,000, the value of the depreciation allowance is at once diminished by two-ninths—or whatever the current earned-income-relief fraction may be—because the smaller founder gets that fraction allowed *in any case* from his earned income. He then gets the remaining seven-ninths of the depreciation allowance at 8s. 6d. in the £—possibly less if he is in a very small way (or if he has a very large family). So that on an outlay of £1,000, his actual tax saving will be about £320. In other words, the Inland Revenue will pay indirectly about one-third of the cost of the new machine. That is the overall picture, spread over the life of the machine, assuming that the standard rate of tax remains the same.

In the case of an outright purchase of a machine which costs £1,000 and qualifies for a 10 per cent. depreciation rate, this will be the capital allowances computation:—

	£	£
Cost of asset		1,000
1st Year		
Initial allowance	200	
Annual allowance	100	
		300
Written-down value		700
2nd Year		
Annual allowance		70
Written-down value		630
3rd Year		
Annual allowance		63
Written-down value		567

and so on.

Most business men will, however, be more interested in the tax relief they can expect in the first year after an outright purchase, or during the currency of a hire-purchase agreement. In the case of an outright purchase, the taxpayer gets an initial allowance of 20 per cent. of the cost of the machine, and an annual allowance at a percentage rate which is fixed by the Board of Inland Revenue for each particular type or class of machine. Motor vehicles get the highest rates and stationary non-moving equipment the lowest rates. The percentage rates are, in fact, calculated on the estimated life of the machine; the local tax inspector will always let founders know the fixed percentage for any particular class of machine.

If the foundryman's profits are £2,300 a year or more then he gets the full amount of £300 (first year) allowed at 8s. 6d. in the £ and his tax saving is therefore £127 10s. If his profits are £2,000 a year or less then the relief will be restricted by two-ninths (£67) leaving £233 allowable at 8s. 6d. in the £ (or whatever is his top rate of tax).

Written-down Value

Written-down value is a much misunderstood term. It means that any amount of depreciation allowed is deducted from the value of the asset for the purpose of calculating future allowances. This value becomes particularly important if the foundryman sells the machinery. Then, if the sale price exceeds the written-down value, as it often does, the excess is chargeable to tax. However, if the sale price is less than the written-down value, the deficiency can be claimed as an additional allowance. These adjustments are officially called (1) a balancing charge, and (2) a balancing allowance. It will be seen that, in effect, the capital allowances are eventually adjusted to the net capital cost of the asset. Balancing charges and allowances are usually deducted or added, as the case may be, in the general capital allowances computation, but the tax can also be assessed directly on, or refunded directly to, the taxpayer.

Many business men are continually puzzled by the fact that the written-down value of their plant and machinery, as it appears in their balance sheet, is quite a different figure from written-down value in the tax computation. The explanation is simple. Capital allowances are often varied to suit political expediency, *i.e.*, to encourage capital investment. It is obvious that a new machine, even a motor-car, costing £1,000, will normally be worth more than £700 at the end of one year. The capital allowance of £300 (which would be more for a motor-car) is not a true rate of depreciation: it is a fictitious figure introduced for a special fiscal purpose. Accountants rightly refuse to be influenced by these special considerations and in their balance sheets they write the assets down at what they consider reasonable rates of depreciation irrespective of the vagaries of the Government with regard to capital allowances. Of course, when the accountant computes the capital allowances for tax purposes, he follows the current tax rules, but he considers that

* Purchases after February 17, 1956, are referred to; prior to that date the investment allowance was in operation.

Buying that New Machine

his balance sheet shows the plant and machinery position much more accurately than the tax computation.

Hire Purchase

If a foundryman buys a machine on hire-purchase, annual allowances are normally given on the full price of the asset, but the initial allowance is calculated only on the amount actually paid off as at the previous April 5. Hire-purchase terms vary, but assuming that a 25 per cent. deposit is required and the term of the agreement is for two years, then on a £1,000 purchase the deposit would be £250 and the monthly payments about £31. The capital allowances computation for the first year would be:—

	£	£
Cost of asset		£1,000
Annual allowance at, say, 10 per cent.	100	
Initial Allowance		
20 per cent. × £250 + £372	124	
		224
Written-down value—end of first year		776

In a hire-purchase agreement there will be interest charges. These can be claimed in full as a deduction from profits, although some accountants prefer to add the interest charges to the capital cost of the asset for the purpose of claiming capital allowance. The first method gives the greater immediate tax relief and is really simpler to operate.

Obviously the Inland Revenue is not going to be much immediate help when a founder is considering buying a new machine, and general trade factors must, therefore, be carefully considered before making a purchase, bearing in mind the Inland Revenue figures only as an additional inducement. New machines are expensive, and with credit tight, the problem that will exercise the founder's mind will be how to make the new machine pay for itself. If a general-purpose machine is not capable of paying for itself within two or three years out of savings effected or in terms of increased profit, then it is generally not worth buying.

ANGLO METAL COMPANY, LIMITED—Mr. C. F. S. Taylor has resigned from the board, and has relinquished his office as joint managing director.

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and he will exercise these powers if necessary. The powers and the consequences which follow their use are set out in Sections 14-18 of the Act. Broadly, they enable the Registrar to serve a notice on anyone whom he has reasonable cause to believe to be a party to a registrable agreement, requiring him to state whether he is or not; and if so, to send particulars of it. The Registrar may also ask the High Court to order an examination on oath of a person on whom a notice has been served, and the High Court may among other things authorize the Registrar to enter in the register any information in his possession about an agreement. It may, if failure to register was wilful, prohibit the performance of the agreement. The Act also provides penalties for failure to comply with a notice served by the Registrar or for misinforming him.

Registration of Restrictive Trading Agreements

February 28 was the date by which particulars of agreements covered by the Board of Trade's Registration Order of last August were required to be sent to the Registrar. Broadly speaking, this Order required the registration of agreements about common prices and conditions of sale, level or agreed tendering, the granting of preferential terms to certain persons or traders, or the confining of supplies of goods to certain persons or traders. Particulars of these agreements, where they were made before November 30, 1956, had to be lodged between that date and February 28, 1957. (Where they were made after November 30, 1956, particulars have to be lodged within three months of making the agreements). Not unexpectedly, many people have left it to the end of the period to send in the particulars; and until late in February, very few had been received. By mid-day on February 28, however, particulars of over 800 agreements had been delivered and they continue to arrive. After they have been sorted, the particulars have to be examined, and a considerable number prove to be incomplete or not in accordance with the requirements of the Act, thus involving further correspondence or discussion before the agreement can be cleared for registration.

Opening of the Public Register

The public register of agreements will be opened not later than April 15, and it will be opened before then if the Registrar has a reasonable body of agreements ready for registration. Further agreements will be added as they are cleared, and as rapidly as possible. The actual date of the opening of the register will be announced as soon as possible.

Form of Register

The register will be kept in identical form in London, Edinburgh and Belfast and will consist of numbered files each containing the particulars of an agreement (or in certain cases a group of agreements) in the form required by the Act and the Registrar's Regulations. The registered particulars will include the whole of the terms of the agreement and the names of all the parties to it. For the convenience of searchers, there will be two indexes to the register. One index will list in alphabetical order the commodities to which agreements relate and the other will group the commodities by classes. The register will be open for inspection from Mondays to Fridays from 10 a.m. to 4.30 p.m. at a fee of 1s. per day, and copies of material in it can be obtained on payment of a fee.

Agreements in operation after February 28

The Act provided that certain agreements need not be registered at all if ended before March 1 and could be registered in their altered form if they were altered before that date. There is no similar provision in the Act for agreements in operation after February 28. Particulars of any agreement of the kind covered by the Board of Trade Order and which is in operation at any time after February 28 must therefore be sent to the Registrar. If the agreement is subsequently ended or changed, particulars of the determination or variation must also be sent in.

Agreements which have not been registered

The Registrar has power to take action about agreements which ought to be and have not been registered.

(Concluded at foot of col. one)

Equipment & Supplies

Ball-type Flow Indicator

A visual check on the flow of air, gas, or cooling water is provided by the "Arkon" ball-type flow indicator (Fig. 1), made by Walker, Crosweller & Company, Limited, Whaddon Works, Cheltenham. This indicator comprises a die-cast body over which a small, toughened-glass dome is held in position by a screw cap. In the flow region of the body is an open-pipe bend providing the seat for a loose ball. In the case of "no flow" the ball rests on the seat, but as soon as flow commences, the ball is lifted off its rest and appears under the dome. The height of the ball in relation to the seat is dependant upon the rate of flow. As a visual aid, the ball is coloured, half white and half black. Minimum flow required for water is ½ pint per min.; for air and gas, ½ cub. ft. per min. The indicator can be fitted at any point in the circuit in a horizontal pipe line.

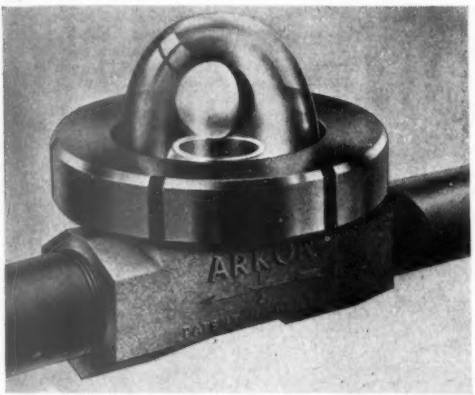


FIG. 1.—*"Arkon" ball-type flow indicator showing the position of the ball when flow is occurring.*

Heat-resisting Metallic-paint

Southern Metalife, Limited, James Street, Harrogate, Yorkshire, announce the availability of a metallic protective paint for steel surfaces—Metalife A T R. This product is claimed to withstand temperatures up to 550 deg. C.; it is applied "cold" either by spray or brush and when dry is said to leave an anodic metal skin, giving cathodic protection to the steel surface. The material is particularly suitable for steel chimneys and furnace exteriors, and it is reported that the longer protection afforded results in substantial reduction in maintenance costs, and obviates the necessity for annual repainting of steelwork.

Plumbago

A new plumbago is being marketed by Dohm Limited, 167, Victoria Street, London, S.W.1, under the name of Dohmbago. This material is guaranteed to be of the same purity as that used in atomic piles, and completely free from any coal, coke or shale dust. Samples are available on application to the address quoted.

Fluorescent Inspection Lamp

Of special interest to founders with problems of inspecting pipe or hollow castings, is the introduction of a small-diameter, lightweight fluorescent lamp. This is being marketed under the trade name of "Lexlite" by Lexington Products, Limited, 3-6, Alfred Place, Tottenham Court Road, London, W.C.1. The lamp, which weighs 9 oz., has a 12-in. tube encased in a rubber-cushioned Perspex cover with a maximum diameter of 1¼in.; it is claimed that the lamp can be easily manipulated in cramped working conditions.

Core-sand Binder

Chas. Page & Company, Limited, 52, Grosvenor Gardens, London, S.W.1, announce that they are marketing a cellulose binder of Swedish origin for core and moulding sands. This material, supplied under the trade name of "Modocore," can be either used in conjunction with an oil binder, or on its own; in addition low-fume emission on casting and at the knock-out is claimed. It is reported that "Modocore" is being extensively used in Swedish foundries where low fume-emission is of paramount importance. Technical data and samples are available by writing to Grosvenor Gardens.

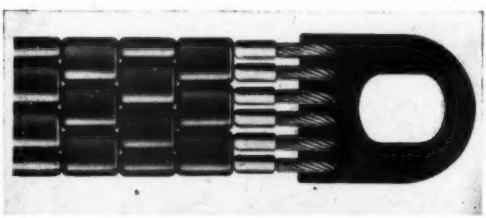
Oil-burner

The production of a self-proportioning oil-burner is announced by Premier Oil Burners, of Lichfield Street, Walsall. The burner incorporates a selective automatic air : oil ratio device, for which by the operation of a single control, it is claimed that a 15 per cent. fuel economy can be effected in burner systems. Other features claimed are that a spring-loaded vee-slot plug-valve compensates for valve wear; a twin-vortex atomizer produces two-stage atomization of the fuel; and that atomizing air being obtained from an independent source gives maximum efficiency over all ranges. Flexibility of flame control, and easy maintenance are additional features mentioned.

Protective Slings

Cable Covers, Limited, St. Stephen's House, London, S.W.1, have introduced a new type of wire-rope sling, shown in Fig. 2. It is provided with rubber segmental sleeves to protect the article to be moved. Marketed under the trade name of "Talurite," the sling is designed mainly for lifting parts requiring delicate handling, but founders well know that finely machined surfaces, even on heavy components, can sometimes be damaged by the careless application of unprotected slings. The slings have a safety factor of eight to one and are available in any length, width or lifting capacity, a proof-loading certificate being issued with each.

FIG. 2.—*Shackle end of a "Talurite" sling, showing the rubber-sleeve protectors.*



Company News

EVERED & COMPANY, LIMITED, brassfounders, metal rollers, etc., of Smethwick (Staffs)—A sharp fall in group trading profits from £381,528 to £258,954 is reported. Taxation accounted for £134,469 (£174,217) and group net profits are £124,485 (£207,311). The dividend on the £500,000 ordinary capital is maintained at 15 per cent. with an unchanged final of 10 per cent.

LEYLAND MOTORS, LIMITED—A substantial increase in turnover resulted in a record group net profit of £2,327,796 (£1,826,372) for the year ended September 30, 1956. The profit figure includes for the first time a full year's profit of Scammell Lorries, Limited. The dividend is repeated at 12½ per cent., but is payable on an increased capital and absorbs £712,471 (£534,353).

ASSOCIATED ELECTRICAL INDUSTRIES, LIMITED—The preliminary statement of the company shows a fall of £5,000,000 to £10,307,614 in group profits before tax. After a lower tax charge of £5,847,901 (£7,370,653), net profit available is down to £4,459,713 (£7,950,127). The total ordinary dividend is maintained at 15 per cent. with a 7½ per cent. final. Total net cost of the ordinary dividend will be £2,645,000 (£2,081,896) the recommended final and the third 2½ per cent. interim for 1956 being on capital increased by a cash issue from £25,000,000 to £33,500,000.

BROWN BAYLEY STEELS, LIMITED—The chairman, Mr. J. W. Garton, reports that supplies of raw materials (with the exception of nickel) were adequate, and output was a little higher for the year to September 29, 1956. Some benefits in output and working conditions have been obtained from resisting two of the smaller units as a result of changes and extensions in other departments. Group net profit was £289,686 (£332,878), and the dividend is 9 (8) per cent. Consolidated fixed assets show a net increase of £182,688 at £1,835,195. The cash position, £350,505 (£620,124) plus tax certificates £466,625 (£400,000), reflects the substantial capital expenditure during the year under review. Reserves total £1,987,136 (£1,768,341).

ASQUITH MACHINE TOOL CORPORATION, LIMITED—The group has expanded and broadened its structure during the past five years, and even further expansion in the years ahead must be considered. The standard of profit should be maintained in the current year and at least the same rate of dividend paid. The chairman, Mr. R. W. Asquith, is confident that industrial development in what were traditional markets will create a demand for other more advanced products from the company. An agreement has been concluded whereby Vickers Australia (Pty.) can manufacture Asquith products. Group profits, before tax, for the year to September 30, 1956, were £666,375 (£601,631), and the ordinary dividend is again 25 per cent., but on larger capital. The 1955-56 figures included 12 months' profits of George Swift & Sons (Holdings), Limited.

GEORGE COHEN 600 GROUP, LIMITED—The company's plans to raise approximately £2,000,000 by placing a new class of preference capital and a rights issue of ordinary shares are submitted by the directors. It is proposed to create 1,500,000 6½ per cent. £1 second cumulative preference shares and 6,000,000 5s. ordinary. One million of the preference will be placed and approximately 1,000,000 raised by an ordinary share issue by way of rights to ordinary shareholders. The company expects that the profits for the year ended March 31 will justify a 7½ per cent. final ordinary dividend on the capital after the proposed issue; the new ordinary shares, however, will not entitle holders to participate in the 3½ per cent. interim payable on March 31.

New Patents

(Copies of complete specifications are obtainable from the Patent Office, Sales Branch, 25, Southampton Buildings, Chancery Lane, London, W.C.2, price 3s.)

766,090. Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

Steel containing nickel 1.5 to 3.5, chromium 0.7 to 1.5, molybdenum 0.1 to 0.5, carbon 0.35 to 0.45, silicon 1.3 to 2, manganese 0.5 to 1, and aluminium 0.02 per cent., the balance apart from the usual impurities is iron.

766,510. Metallgesellschaft, A.G., 45, Bockenheimer Anlage, Frankfurt on the Main, Germany.

A process of bonding light metals on to an iron surface. An example is given of an aluminium-alloy which was to be cast around a cast-iron core. The core was first covered with an aqueous 1 per cent. zinc chloride solution, the water was removed by drying at 110 deg. C. The bright cast iron, from which the oxides had been removed was dipped for 5 min. into a melt of 69 per cent. tin, 30 per cent. zinc, and 1 per cent. rare-earth metal mixture (including cerium), and was moved about in the melt. This was at a temperature of 400 deg. C. After the removal from the melt, the surplus liquid metal adhering was thrown off and the casting was quenched in water. After the casting had been heated to 120 deg. C. it was placed in a chill mould and an aluminium-alloy, containing 12 per cent. silica, was cast around it.

766,584. Mannesmann A.G., 1b Mannesmannufer, Düsseldorf, Germany.

In the casting of metals of low-thermal conductivity, particularly ferrous metals, it is known that the core tends to become porous, resulting in sponginess of the metal. Isolated cavities or even continuous thread-like pipes are readily formed along the longitudinal axis of the casting.

The method suggested claims to prevent this. It consists of forcing the solidifying-gromets of the crust of a partially-solidified billet issuing from a chill mould, together, to fuse to each other. This is achieved by subjecting the billet to lateral pressure applied by rolls at a point above the natural terminating point of the residual liquid core, without effecting substantial elongation or a substantial change in the thickness of the crust of the billet.

766,791. English Steel Corporation, River Don Works, Brightside, Sheffield, 9.

A process for the manufacture of permanent magnets of the Fe/Al/Ni/Co type. A casting of the magnet alloy is made with the addition of cerium and/or lanthanum in the range 0.16 to 0.81 per cent., by weight. The casting is then hot-worked into the size required.

767,114. Fairey Aviation Company, Limited, North Hyde Road, Hayes, Middlesex.

A method of making a mould for use in the "lost-wax" casting process. A wax pattern is coated with a thin film of fine material to form the surface of the mould. A waterproofing compound (containing a non-water-soluble cellulose derivative) is applied to the surface of the coating. After this the pattern is invested with a body of coarser material to form the body of the mould.

767,142. R.T.C. Rasmussen, 1751, Blaine Avenue, Cambridge, Ohio, USA.

This invention refers to smelting processes and in particular to the operating of smelting furnaces. It applies especially to electric furnaces, but may also be applied to fuel-fired types. It aims to treat previously untreatable raw materials at economic costs.

News in Brief

THE CHIEF LIBRARIAN, College of Technology, Goston Green, Birmingham, 4, would welcome the regular receipt of trade literature.

VICKERS, LIMITED, are seeking information which will enable them to trace a piece of sculpture, or a portrait, of George Porteous Naylor (1769-1861), founder of a Sheffield steel company.

A NEW FACTORY for Black & Decker, Limited, manufacturers of portable electrical tools, of West Drayton (Middx), has been established at Lilydale, 23 miles from Melbourne, Australia.

THE BATTELLE MEMORIAL INSTITUTE, Columbus 1, Ohio, has published a folder and leaflets describing the facilities the Institute provides for giving tuition in the field of management, in which a thoroughly practical approach to the subject is disclosed.

THE BOARD OF TRADE, in conjunction with the United Kingdom Atomic Energy Authority and in consultation with industry, will be organizing two displays at overseas trade fairs in Germany and Australia, in 1957, to illustrate Britain's atomic-energy programme.

BORAX & CHEMICALS LIMITED, Kings Bourne House, 229 High Holborn, London, W.C.1., announce that with effect from April 1, the price of anhydrous borax, refined pentahydrate borax and boric acid will be increased by £3 10s. 0d. per ton and hydrous borax by £3 per ton.

BRITISH THOMSON-HOUSTON COMPANY, LIMITED, has obtained an order valued at more than £1,500,000 for two 120,000-kw. C.M.E.R. turbo-alternator sets for the new Padiham "B" power station of the Central Electricity Authority (North West Merseyside and North Wales Division).

B. ELLIOTT & COMPANY, LIMITED, Victoria Works, Willesden, London, N.W.10, are organizing an exhibition at the Drill Hall, Old Market Street, Bristol, where they will show a range of 100 machine tools. The show is to be held from May 20 to 25 inclusive, and application for invitations should be addressed to Victoria Works.

THE COIL SPRING FEDERATION RESEARCH ORGANIZATION was inaugurated at the BISRA laboratories in Hoyle Street, Sheffield, on March 6, when 60 visitors were welcomed by Mr. Robert Salter Bache, president of both the Federation and the Research Organization. Mr. R. Haynes, deputy director of research, gave details of the programme of the organization.

WORCESTER AND DISTRICT MANAGEMENT ASSOCIATION, founded four years ago to stimulate interests in industrial and commercial management, has progressed so well that it held its first annual dinner on February 22, at which Mr. G. R. Ward Secretary of State for Air and the Member for the Division, and the Mayor of Worcester, Coun. B. Brotherton, were chief guests.

THE BRITISH INSTITUTE OF MANAGEMENT announce that a regional conference is to be held at Droitwich from April 5 to 7; the theme being "Meeting Tomorrow's Problems." Amongst the speakers is Mr. C. L. Old, principal of Wolverhampton and Staffordshire College of Technology. Details are available by writing to the secretary of the Institute at 8, Hill Street.

CONTRACTS for over 200 miles of tubing, mainly of austenitic stainless steel, have been received by the Tube Investments subsidiary, Accles & Pollock, Limited, Oldbury, Birmingham, from the A.E.I.-John Thompson Nuclear Energy Company, Limited, and the G.E.C.-Simon-Carves Atomic Energy Group, who are building the nuclear power stations in Gloucestershire and on the Ayrshire coast.

ABOUT 100 EMPLOYEES of Hattersley Bros., Limited, Queen's Foundry, Swinton, Mexborough, Yorks, attended their annual Sports Club dinner. Mr. F. Young, managing director and chairman, presided, and Mr. W. H. H. Sutcliffe, captain of Yorkshire County Cricket Club, was the chief guest. A presentation was made to Mr. J. D. Schofield who has retired after serving 64 years with the company.

THE SOUTHWICK WORKS of George Clarke & North Eastern Marine Company, Limited, Sunderland, have booked orders for five engines worth a total of £1,500,000. The engines are of the Clarke-Sulzer type, the patentees of which are a Swiss concern, and will be fitted in vessels to be built on the Wear. Orders now in hand for the Southwick works are estimated to be sufficient to keep them busy until the end of 1961.

THE TOTAL REFINED ZINC production in OEEC producer countries, Austria, Belgium and the Belgian Congo, France, Germany, Italy, Netherlands, Norway and the United Kingdom, amounted to 71,656 metric tons in January, 1957, as compared with 72,391 metric tons in December, 1956. The January figure included 26,531 metric tons of high-grade and special high-grade zinc

SAML. DENISON & SON, LIMITED, makers of weighing and testing machines, Hunslet Foundry, Leeds, 10, announce that they have opened area sales offices at King's House, 42, King Street West, Manchester, 3 (Tel: Blackfriars 1986) where Mr. H. Hunt has been appointed north west area sales manager, and West Bar Chambers, 38a, Boar Lane, Leeds, 1. (Tel: Leeds 2-8433) where Mr. S. A. Morris is to be the north east area sales manager.

IN the Northern Ireland House of Commons last week, Lord Glentoran (Minister of Commerce) said that it had been decided to proceed with plans for an atomic power station in Northern Ireland to be brought into operation in 1963-64. The output would be 150 megawatts, and the station, estimated to cost £25,000,000, would be established and operated by the Electricity Board who have already arranged for the special training of engineers.

THE QUEEN sent a telegram of good wishes to the centenary banquet of the Sheffield Chamber of Commerce which was held in the Cutlers' Hall on Tuesday, March 5. The banquet was attended by more than 400 representatives of industry and the professions, including the Archbishop of York, Dr. A. M. Ramsey, who had preached at the centenary service at the cathedral in the afternoon. Lord Hawke proposed the toast of "The Chamber."

THE FRIENDS OF BATH ABBEY, have made themselves responsible under the Abbey restoration scheme for the re-tuning of the famous bells of the church, which also incorporates a carillon. In Bath Abbey "notes" it is stated: "A noteworthy event of the month was the lowering of the Abbeys ten bells, followed by their loading and dispatch for re-tuning to the bell foundry at Loughborough, an operation unlikely to be repeated within the lifetime of anyone who witnessed it."

MEMBERS OF THE INSTITUTION OF METALLURGISTS last week made an official tour of the department of metallurgy at the new Birmingham College of Technology at Gosta Green. Addressing the visitors Dr. L. G. Slater, principal of the Department, said that now the college had been designated one of the eight colleges of advanced technology, the work of the department could be expected to expand at more advanced levels. Three new research laboratories were being equipped. The department would work in close liaison with local industries.

Personal

Mr. JIM HOLMAN, sales director of Holman Brothers, Limited, of Camborne, Cornwall, is at present on a business trip in South America.

Mr. THOMAS SCOTT, manager of the heavy iron foundry at the Carron Company, Falkirk, has retired after 16 years service with the firm.

Mr. JOHN D. BERRESFORD, commercial manager of the Staveley Iron & Chemical Company, Limited, has been appointed a director of the company.

Dr. D. HARRISON, demonstrator in chemical engineering at Cambridge University, has been elected a fellow of Selwyn College, of which he was formerly a scholar.

Mr. GERALD MCQUADE, a wages clerk with the Appleby-Frodingham Steel Company (branch of the United Steel Companies, Limited), has been invited to be the next mayor of Scunthorpe.

Mr. F. G. GOODALL has relinquished his positions as a director and chief accountant of the Brooke Tool Manufacturing Company, Limited.

Mr. N. M. PEECH, chairman and managing director of the Steetley Company, Limited, and a director of the Sheepbridge Engineering Company, Limited, and of other companies, left Southampton on March 8 for New York.

The President of the Board of Trade has appointed LORD RIDLEY to be a member of the Export Credits Guarantee Department's Advisory Council: this follows the resignation of LORD MILLS on becoming Minister of Power.

Mr FREDDY JAMES, technical representative with Firth Brown Tools, Limited, Sheffield, returned on March 2 after a seven-week tour in South. Africa in connection with starting a service department for the company's tools in that country.

Mr. JOHN FOX, has been appointed manager of the London office of Belliss & Morcom, Limited, engineers, of Birmingham, to take effect on April 1. He will succeed Mr. F. C. RIVERS, who retires from this post on March 31 after 46 years' service with the company.

Mr. C. J. WILLIAMS, until lately manager of the casting division of High Duty Alloys, Limited, has been appointed technical and sales director of A. Wigley (Belper), Limited, of Horsley, Woodhouse, Derbyshire, aluminium smelters and ingot manufacturers.

Sir CLAUDE D. GIBBS, chairman of A. Reyrolle & Company, Limited, Hebburn (Co. Durham), and managing director of C. A. Parsons & Company, Limited, Newcastle-upon-Tyne, has been elected chairman of governors of the new Rutherford College of Technology at Newcastle-upon-Tyne.

Inscribed gold watches have been presented to Mr. GEORGE CASS and Mr. J. W. BOTTOMLEY to mark the completion of 50 years' service with Charles Roberts & Company, Limited, railway wagon works, Horbury Junction, near Wakefield. Mr. Cass is foreman in the wheel department and Mr. Bottomley is foreman blacksmith.

THE MARQUESS OF ABERGAVENNY, and Lieut.-General LORD WEEKS, have been elected to the board of Massey-Harris-Ferguson, Limited, Toronto. The two appointments are to the board of the parent company. Lord Abergavenny and Lord Weeks are already directors of the Massey-Harris-Ferguson organization in the UK.

Mr. JAMES MCLEAN, chief designer of the Motherwell Bridge & Engineering Company, Limited, has been appointed general manager in succession to Mr. WILLIAM BRYSON, who is to retire on July 31. Until Mr. Bryson's retirement, Mr. McLean will serve as joint general manager; he joined the company in 1950 as chief designer.

72-year-old Mr. CHARLES MARSH, a shearer in the low warehouse of the Brightside Works of William Jessop & Sons, Limited, steelmakers, Sheffield, retired on Friday, March 8, at the age of 72, after 48 years with the firm. He originally joined in 1900 and afterwards left for nine years before returning. He holds the firm's 25 years' service watch and 40 years' service certificate. His colleagues presented him with a gift.

Mr. R. B. REEVE, publicity manager of Ransomes Sims & Jefferies, Limited, has retired after 44 years' service with the firm; he is succeeded by Mr. D. H. STOCKER, who will co-ordinate publicity, advertising and public relations duties. Mr. R. J. GARNHAM has relinquished his position as public relations officer and is to succeed Mr. E. J. BRADLEY as lawn-mower sales manager. Mr. E. J. Bradley will be retiring on April 30.

Mr. J. L. RICE, B.Met., is leaving the British Non-Ferrous Metals Research Association to join the Harlow Metal Company, Limited, associated with Johnson, Matthey, & Company, Limited. As a record of some of his work with the BNFMRA, Mr. Rice's two reports on shell moulding and another on the CO_2 Process will long be esteemed by foundrymen. In his new sphere of activity, Mr. Rice expects to retain contact with the foundry industry.

Mr. GEORGE WEST, whose appointment is announced as assistant export manager of the chemicals division of Newton, Chambers & Company, Limited, Thorncliffe, near Sheffield, is the son of Sir Harold West, the company's former managing director. Mr. West joined the company in 1954 as assistant to the secretary and later transferred to the chemicals division. After gaining experience in the home sales and accounts departments, he joined the export department last year.

Mr. B. BUTCHER, organizing superintendent and labour manager of Samuel Fox & Company, Limited, a subsidiary of the United Steel Companies, Limited, has been appointed a director of Samuel Fox from February 21. Mr. Butcher, who has been with the company for 52 years, was appointed labour manager in 1930 and organizing superintendent in 1933. He has been a Justice of the Peace since 1944, and is deputy chairman of the Hallamshire Division of the West Riding Magistrates' Bench.

Obituary

Mr. JOHN CROMBIE WILLIAMSON, who had been manager of William Jacks & Company, Limited, Bombay, since 1947, died on February 22.

Mr. GEORGE P. TAYLOR, who has died at the age of 77, was the founder, in 1923, of the brass foundry in Park Road, Hamilton, Lanark, of Geo. Taylor & Company.

Mr. CHARLES DANBY HOBBS, one of the pioneers of the British Columbia steel industry, who founded his first company nearly 40 years ago and was responsible for the inception of Western Canada Steel, Limited, has died at the age of 66.

Raw Material Markets

Iron and Steel

Basic steelmaking pig-iron continues to be in heavy demand; outputs are readily absorbed by the steelworks, which are taking up three quarters or more of overall production. There is no appreciable increase in the demand for pig-iron by the ironfoundries, and outputs are more than sufficient to meet requirements. There are signs in the Midlands of an improved take up in pig-iron for the foundries engaged in the motor-car industry. It is hoped that this will continue, as recently there have been signs in other trades of a curtailment in demands for low-phosphorus and hematite irons, notably for castings for the machine-tool industry. Many other foundries producing high-duty castings for atomic power and electrical plants, general engineering purposes, etc., continue to take up good tonnages of these grades of pig-iron, but makers generally are able to cope with these demands.

Producers of high-phosphorus pig-iron need additional orders; many of them could send tonnages overseas if licences could be obtained. Very little, if any, improvement is found in the light-casting trade, but seasonal influences may shortly quicken activity. Those foundries making gutters and pipes are busy, but the textile, domestic utensil, and building trades are calling for only moderate tonnages of castings. The jobbing foundries and many of the engineering foundries, too, are now taking up bigger tonnages of high-phosphorus iron.

The foundries are mainly well provided with scrap. Arisings of heavy and machinery cast-iron scrap are readily accepted, while the lighter and medium grades are plentiful. Foundry coke deliveries are satisfactory, and ganister, limestone, and firebricks are available as required.

The re-rollers have good order-books, but for small bars pressure for supplies has eased and makers could take on additional orders for export at remunerative prices. Demand for light sections and ferro-concrete bars is active.

Home steelworks maintain a good rate in deliveries of steel semis, with sustained pressure for small sizes of billets and special quality steel in particular. Many re-rollers are also specifying for untested grade billets, but most of the steelworks do not normally supply this grade.

Non-ferrous Metals

Opinions about the future outlook for the copper price are at sixes and sevens. Some aver that with the improvement in oil supplies and the imminent opening of the Suez Canal demand will revive. In this same school of thought there are those who believe that consumers have run down their stocks and will soon be forced to come back into the market. Others feel that, although demand will revive, world production is expanding rapidly and this, coupled with the fact that producers have not sold all their output in recent months, will be enough to satisfy the market without any perceptible stiffening in the price. Certainly, without any major cut-back in US production it is difficult not to side with those who believe that the £240 a ton level is high enough under the present conditions.

Meanwhile, demand for copper in London remains much the same as heretofore with little fresh inquiry and little selling pressure. At the moment all the markets are feeling the impact of the threatened strikes in the engineering and shipbuilding industries. Under this influence copper went below £240 a ton on Monday to reach its lowest level for a very long time. In America copper is moving off the market at a fair rate at both 31 cents and 32 cents a pound. Scrap prices are a shade firmer and the export price, which dipped below 30 cents last week, is back at that level. There is no indication of any kind that producers are preparing to cut back production.

The tin price continues to droop despite the paucity of stocks in LME warehouses, a widening backwardation, and the continuation of the strike at the Butterworth smelter in Malaya. This paradox is resolved by the expectation that more supplies will be made available from the UK smelters and also from the Dutch smelter, which is now in receipt of additional tonnages of Indonesian concentrates. Demand in London is sporadic pending the outcome of the International Tin Council meeting on Wednesday at which it is thought an upward revision of the present price limits of the buffer pool will be considered. Consumer demand in America and on the Continent is reported as fairly good.

Lead is sagging for lack of support. Demand is only fair, while available supplies of the metal have increased following the completion of the Government's disposal to the trade of its stockpile. Buying on the Continent is of a routine nature and much the same situation applies in America.

Zinc is also easing in London, although the undertone is firm. This is thought to be due to the knowledge that US barter transactions in January were fairly substantial and also to the news that Japan is buying Australian concentrates to make up for her own domestic shortfall in production. In the States the price remains steady at 13½ cents a pound for "Prime Western" grade, East St. Louis.

Warning on Common Market

There are likely to be serious dangers to British heavy industry within the conception of the proposed European common market, said the Master Cutler, Sir Peter Roberts, speaking at Sheffield recently. It seemed as if the idea had been accepted in principle, but little if anything was heard of proposed safeguards.

"Our Continental friends see in this an advantage to themselves in that they can raise their standard of living at our expense," he said. The defalcation of such people as Peron and Nasser were lessons they should remember. Britain would jump at the chance of an open American market ("We could undercut them in almost everything") and, he believed, Europeans thought the same way about Britain. "There are serious dangers in the short term to our standard of living. If investment flows freely through Europe it is likely to go to Milan where labour is cheaper," he said.

The Lord Mayor of Sheffield (Ald. R. Neill) stressed that Britain should look to the Commonwealth for its development. "If we did," he said, "we should have the biggest potential market in the world and I hope the Government will do something about it quickly."

Netherlands Foundry Association

The annual general meeting of the Netherlands Foundry Association, took place last Tuesday at the Esplanade Restaurant, at Utrecht, under the presidency of Mr. F. W. E. Spiess. Papers on various aspects of the foundry industry were given by Mr. G. C. M. Hardebeck; Mr. A. de Bruin; and Mr. J. W. Niermans.

Current Prices of Iron, Steel, and Non-ferrous Metals

(*Delivered unless otherwise stated*)

March 13, 1957

PIG-IRON

Foundry Iron.—No. 3 IRON, CLASS 2:—Middlesbrough, £20 1s. 0d.; Birmingham, £19 13s. 3d.

Low-phosphorus Iron.—Over 0.10 to 0.75 per cent. P, £21 18s. 0d., delivered Birmingham. Staffordshire blast-furnace low-phosphorus foundry iron (0.10 to 0.50 per cent. P, up to 3 per cent. Si), d/d within 60 miles of Stafford, £22 2s. 3d.

Scotch Iron.—No. 3 foundry, £23 4s. 6d., d/d Grangemouth.

Cylinder and Refined Irons.—North Zone, £24 6s. 6d.; South Zone, £24 9s. 0d.

Refined Malleable.—P, 0.10 per cent. max.—North Zone, £25 14s. 0d.; South Zone, £25 16s. 6d.

Hematite.—Si up to 2 per cent., S. & P. over 0.03 to 0.05 per cent.:—N.-E. of England (local iron), £22 17s. 6d.; Scotland (Scotch iron), Zone S. 1, £23 4s. 0d.; Sheffield, £24 4s. 6d.; Birmingham, £24 12s. 0d.; Wales (Welsh iron), £22 17s. 6d.

Basic Pig-iron.—£19 3s. 0d. all districts.

FERRO-ALLOYS

(*Per ton unless otherwise stated, delivered*)

Ferro-silicon (6-ton lots and over).—45 per cent. Si, £50 0s. 0d. to £53 5s. 0d., scale 17s. 0d. to 17s. 6d. per unit; 75 per cent. Si, £70 0s. 0d. to £76 7s. 6d., scale 17s. 0d. to 17s. 6d. per unit.

Ferro-vanadium.—50/60 per cent., 28s. 6d. per lb. of V.

Ferro-molybdenum.—65/75 per cent., carbon-free, 12s. 3d. per lb. of Mo.

Ferro-titanium.—20/25 per cent., carbon-free, £250 0s. 0d.; 38/40 per cent., £299 0s. 0d.

Ferro-tungsten.—80/85 per cent., 11s. 7d. per lb. of W.

Tungsten Metal Powder.—98/99 per cent., 14s. 7d. per lb. of W.

Ferro-chrome (6-10 ton lots).—4/6 per cent. C, £96 0s.0d. to £99 10s. 0d., basis 60 per cent. Cr, scale 31s. 0d. to 33s. 0d. per unit; over 6 per cent. C, £94 0s. 0d., basis 60 per cent. Cr, scale 31s. 0d. to 33s. 0d. per unit; 2 per cent. C,* 2s. 2d. per lb. Cr.; 1 per cent. C,* 2s. 2½d. per lb. Cr; 0.15 per cent. C,* 2s. 3d. to 2s. 3½d. per lb. Cr; 0.10 per cent. C,* 2s. 3½d. to 2s. 3¾d. per lb. Cr; 0.06 per cent. C,* 2s. 3½d. to 2s. 4d. per lb. Cr.

Metallic Chromium.—98/99 per cent., 7s. 0d. to 7s. 6d. per lb.

Metallic Manganese.—90/92 per cent., carbon-free, £290 0s. 0d.; 96/98 per cent., £310 0s. 0d.

Ferro-columbium.—65/75 per cent. Nb + Ta, 22s. 0d. to 23s. 0d. per lb., Nb + Ta.

Ferro-manganese (home).—78 per cent., £82 12s. 6d.

SEMI-FINISHED STEEL

Re-rolling Billets, Blooms, and Slabs.—BASIC: Soft, u.t., £30 9s. 0d.; tested, 0.08 to 0.25 per cent. C, £31 9s. 0d.; hard (0.41 to 0.60 per cent. C), £32 10s. 6d.; silico-manganese, £41 0s. 0d.; free-cutting, £34 13s. 0d. SIEMENS MARTIN ACID: Up to 0.25 per cent. C, £38 4s. 6d.; silico-manganese, £41 7s. 6d.

Billets, Blooms, and Slabs for Forging and Stamping.—Basic, soft, up to 0.25 per cent. C, £36 3s. 6d.; basic, hard, over 0.41 up to 0.60 per cent. C, £37 6s. 0d.; acid, up to 0.25 per cent. C, £40 7s. 6d.

FINISHED STEEL

Heavy Plates and Sections.—Ship plates (N.-E. Coast), £39 2s. 0d.; boiler plates (N.-E. Coast), £41 12s. 0d.; floor plates (N.-E. Coast), £40 11s. 0d.; sectional material, N.-E. Coast, £37 11s. 6d.

Small Bars, Sheets, etc.—Rounds and squares, under 3 in. untested (4-ton lots), £37 18s. 0d.; flats, 5 in. wide and under (4-ton lots), £37 18s. 0d.; hoop and strip, £37 17s. 6d.; uncoated strip mill coils, hot rolled, under 3mm. to 12g., £41 6s. 0d.; black sheets (hand mill), 17/20 g., £52 4s. 6d.; galvanized corrugated sheets, 24 g., £65 9s. 0d.

Alloy Steel Bars.—1 in. dia. and up: Nickel, £64 13s. 9d.; nickel-chrome, £88 15s. 3d.; nickel-chrome-molybdenum, £100 13s. 9d.

NON-FERROUS METALS

Copper.—Cash, £240 5s. 0d. to £240 10s. 0d.; three months, £239 10s. 0d. to £239 15s. 0d.; settlement, £240 10s. 0d.

Copper Tubes, etc.—Solid-drawn tubes, 2s. 4½d. per lb.; rods, 274s. 0d. per cwt. basis; 20 s.w.g., 307s. 3d. per cwt.

Tin.—Cash, £764 0s. 0d. to £765 0s. 0d.; three months, £747 0s. 0d. to £748 0s. 0d.; settlement, £765 0s. 0d.

Lead (Refined Pig).—First half March, £113 5s. 0d. to £113 10s. 0d.; first half June, £112 10s. 0d. to £112 15s. 0d.

Zinc.—First half March, £96 15s. 0d. to £97 0s. 0d.; first half June, £95 0s. 0d. to £95 5s. 0d.

Zinc Sheets, etc.—Sheets, 15g. and thicker, all English destinations, £129 5s. 0d.; rolled zinc (boiler plates), all English destinations, £127 0s. 0d.; zinc oxide (Red Seal), d/d buyers' premises, £110.

Brass Tubes, etc.—Solid-drawn tubes, 1s. 11⅛d. per lb.; rods, drawn, 2s. 11d.; sheets to 10 w.g., 209s. 6d. per cwt.; wire, 2s. 8½d.; rolled metal, 209s. 6d. per cwt.

Brass (Brazing).—BS1400, B3 (65/35), £181; B6 (85/15), —; BS249, —.

Brass (High Tensile).—BS1400, HTB1 (30 tons), £237; HTB2 (38 tons), — ; HTB3 (48 tons), —.

Gunmetal.—BS1400, LG2 (85/5/5/5), £242; LG3 (86/7/5/2), £253; G1 (88/10/2/½), £303; (88/10/2/1), — .

Phosphor Bronze.—BS1400, PB1 (AID released), £318 per ton.

Phosphor Bronze Strip, etc.—Strip, 293s. 3d. per cwt.; sheets to 10 w.g., 293s. 3d. per cwt.; wire, 4s. 0½d. per lb.; rods, 3s. 4½d.; tubes, 3s. 4½d.; chill cast bars: solids 3s. 4d., cored 3s. 5d. (CHARLES CLIFFORD, LIMITED.)

Nickel Silver, etc.—Rolled metal, 3 in. to 9 in. wide × 0.056, 3s. 10d. per lb.; round wire, 10g. in coils (10 per cent.), 4s. 2¾d.; special quality turning rod, 10 per cent., ½ in. dia., in straight lengths, 4s. 1¾d. All prices are net.

Other Metals.—Magnesium, ingots, 2s. 5½d. per lb. Antimony, English, 99 per cent., £210 0s. 0d. Quicksilver, ex-warehouse, £84 10s. 0d. to £84 15s. 0d. Nickel, £600 0s. 0d. Aluminium ingots, £197 0s. 0d.; aluminium bronze (BS1400), AB1, £265; AB2, — . Solder, brazing, BS1945, type 8 (50/50), — per lb., type 9 (54/46), — per lb.

* Average 68-70 per cent.

GAS FIRED CARBOTTOM FURNACES WITH TRANSFER BOGIE INSTALLED FOR THE HEAT TREATMENT OF SPECIAL CAST IRONS

Illustration by courtesy of SHEEPBRIDGE STEEL CASTINGS LTD.

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Publications Received

Customer/Founder Convention, 1956*. Being the Proceedings of a One-day Conference, published by the British Steel Founders' Association (who organized the Convention), Broomgrove Lodge, 13, Broomgrove Road, Sheffield, 10.

This conference was very different from an earlier one when the customers were full of complaints and the steelfounder was clamouring for better co-operation. Now there was exhibited a wholesale desire on both sides for the mutual consideration of their joint problems. For instance, as the chairman, Mr. G. M. Menzies, rightly pointed out, welding in steelfounding was no longer regarded as a repair, but as part of the foundry process. Then, because designers were inclined to use fabricated parts or weldments for the simpler shapes, and leaving the foundry to tackle the complex components, it was no wonder the average price level tended to rise. Three papers were presented to the conference—two by users—" Acceptance Standards," by Mr. A. C. Annis and " The Surveyor's Viewpoint on Steel Castings," by Dr. S. F. Dorey, F.R.S., and one by a steel founder—" Fulfilling Requirements," by Dr. C. J. Dadswell. It can be stated without reservation that the convention has every promise of yielding good results in the field of co-operation.

Die Giesserei-industrie und Ihre Helfer (The foundry industry and associated trades) 1956. Published by Industrieschau-Verlagsgesellschaft m.b.h., 8 Gerauer Allee, Darmstadt, Germany (in German); price 24s.

This book, published in connection with the Düsseldorf International Foundry Exhibition, lists all the foundries of the Federal Republic of Germany and of West Berlin. The information given includes the names of directors and executives; capital available; number of employees; the year of foundation; bankers; range of manufacture, etc. It also contains a detailed market report on the situation of the German foundry industry, and articles on new methods and designs. The guide not only carries a wealth of information on founders, it also comprises a very extensive register of all foundry products available. In this section, the firms are listed according to classified headings. The publication is an indispensable aid to all those interested in forming an exact idea of the scope of the German foundry industry to-day, and is unhesitatingly recommended to readers.

Nickel—the Story of a Major Metallurgical Industry. Published by the Mond Nickel Company, Limited, Thames House, Millbank, London, S.W.1.

This story is particularly well written and illustrated. Neither too short nor too long, this 56-page booklet maintains the reader's interest throughout. The story starts with the mining of the ore and next details its treatment to yield, not only nickel, but quite a range of precious metals. At the end, an amazing list of applications is detailed, and finally—if the reader be interested in any particular phase of nickel application—there is listed a number of publications available for further study.

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* A brief account of the Convention appeared in the FOUNDRY TRADE JOURNAL, issue dated December 13, 1956.

ROTHERHAM RURAL DISTRICT COUNCIL public health committee has recommended the deferment for three months of the consideration of the building bye-laws of the Clean Air Act. This was an amendment carried by two to one after a proposition to adopt one bye-law forthwith.

Forthcoming Events

MARCH 18

Sheffield Society of Engineers and Metallurgists

" Materials of Construction in the Heavy Chemical Industry," by F. H. Keating, 7.30 p.m., at the Engineering Lecture Theatre, University Buildings, St. George's Square.

MARCH 19

Institute of British Foundrymen

East Anglian section:—" Practical Implications of Research on the Casting of Non-ferrous Metals," by E. C. Mantle, 7.30 p.m., in the Lecture Hall, Public Library, Ipswich.

Slough Section:—Film " Flow of Metal into Moulds," introduced by R. W. Ruddle, 7.30 p.m., at the Lecture Theatre, High Duty Alloys, Limited.

Sheffield Metallurgical Association

" Modern Trends in Iron and Steelmaking Refractories," by Dr. H. R. Lahr, 7 p.m., at the British Iron and Steel Research Association Laboratories, Hoyle Street, Sheffield.

MARCH 20

Institute of British Foundrymen

Southampton section:—" Latest Developments in Spheroidal-graphite Iron," Paper by W. W. Braidwood, to be read by Mr. G. L. Harrison (owing to Mr. Braidwood's absence from the country), 7.30 p.m., at the Technical College, St. Mary's Street.

West Riding of Yorkshire branch:—" Malleable Iron," by H. Morrogh, at the Technical College, Bradford.

Scottish North-East section:—Annual general meeting, 7.30 p.m. (Details from the secretary.)

Institution of Production Engineers

Birmingham section:—Annual general meeting and " Modern Techniques in Die-casting Practice," by J. Bailey, 7 p.m., at the James Watt Memorial Institute, Great Charles Street.

MARCH 21

Institution of Works Managers

Doncaster branch:—" Industrial Engineering, Its Scope and Opportunities," by W. G. Worsdale, 7.30 p.m., at the Danum Hotel.

Institute of British Foundrymen

Beds/Herts section:—" Inspection of Castings," by Mr. E. Barleggs, 7.30 p.m., at K. & L. Steelfounders & Engineers, Limited, Letchworth.

Society of Chemical Industry

Corrosion group:—Symposium—" Corrosion of Metals in Buildings," 9.30 a.m. to 6.0 p.m., at the Institution of Civil Engineers, Great George Street, London, S.W.1.

Institution of Production Engineers

Glasgow section:—" Ferrous Die-casting," by C. A. Payne, 7.30 p.m., at the Institution of Engineers & Shipbuilders, 39, Elmbank Crescent.

MARCH 22

Society of Industrial Radiology

" Modern Trends in Non-destructive Testing," by R. S. Sharpe, 7 p.m., at the Grand Hotel, Bristol.

Contracts Open

The dates given are the latest on which tenders will be accepted. The addresses are those from which forms of tender may be obtained. Details of tenders with the reference ESB can be obtained from the Board of Trade Export Services Branch, Lacon House, Theobalds Road, London, W.C.1 (telephone: CHAncery 4411, ext. 738 or 771), unless otherwise stated.

BURMA, March 19—Manhole covers, for the Union of Burma Purchase Board. (ESB/5842/57.)

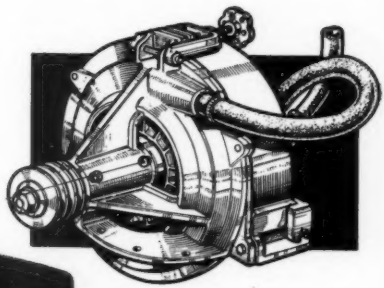
BURMA, March 22—Crucibles, for the Union of Burma Purchase Board. (ESB/5725/57.)

GLASGOW, March 16—Castings, iron and steel, etc., for one year from June 1, for the City Council. The Chief Engineer and General Manager, Water Department, 50, John Street, Glasgow, C.1.

GREAT HARWOOD, March 16—Manhole covers and gully grates for 12 months from April 1, for the Urban District Council. The Engineer and Surveyor, Town Hall, Great Harwood (Lancs).

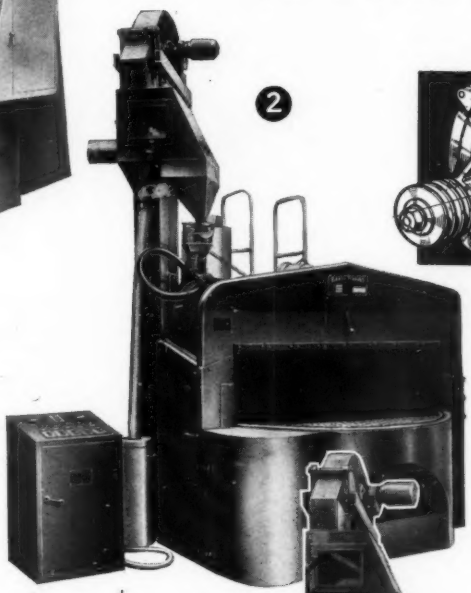
Shot Blast Equipment

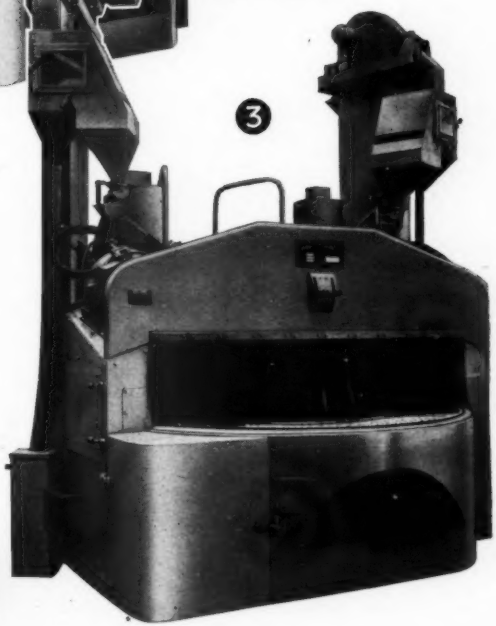
This A-S-L Turbine is the most modern Shot Blasting Unit available. The bi-phase air injection system enables shot to be projected at greater speeds using lower power with fewer replacements. The economies effected in spare parts alone are very substantial.



Baker Perkins High Speed Bi-Phase A-S-L Turbine, British Patent, No. 510681.

These machines do not require pits or special foundations.





1. **ROTARY BARREL**
2. **CADET**
3. **MEDIUM**

Our standard range of Rotating Barrel and Table Shot Blast Machines is capable of handling a wide range of Foundry products. Both types are semi-automatic, the rotating barrels being equipped with skip hoist loading gear and frontal discharge mechanism. These modern highly efficient machines are in use in Foundries all over the world, and are built to the high standards of design, materials and workmanship characteristic of all Baker Perkins' machines.

BAKER PERKINS LIMITED
ENGINEERS
WESTWOOD WORKS · PETERBOROUGH

Imports and Exports of Iron and Steel in January

The following tables, based on Board of Trade returns give figures of imports and exports of iron and steel in January. Figures for January, 1956, are included for purposes of comparison.

Total Exports of Iron and Steel

Destination.	Month ended January 31.		Month ended January 31.	
	1956.	1957.	1956.	1957.
	Tons.	Tons.	£	£
Channel Islands	662	378	37,020	26,594
Cyprus	205	707	13,627	52,675
Sierra Leone	418	1,114	30,032	71,671
Gold Coast	1,727	2,284	121,046	169,338
Nigeria	5,669	3,815	390,433	304,966
Union of South Africa	9,221	5,848	495,884	416,585
Rhodesia and Nyasaland	3,894	7,016	227,775	397,210
Tanganyika	954	3,000	55,736	164,829
Kenya	4,158	3,866	257,785	212,300
Uganda	811	686	54,838	35,481
Mauritius	127	368	8,601	24,249
Aden	354	208	24,488	17,090
Bahrein, Qatar, and Trucial States	823	131	51,105	10,462
Kuwait	129	443	12,878	50,525
India	28,470	20,880	1,311,937	1,247,160
Pakistan	5,955	2,003	308,834	122,965
Singapore	2,687	3,421	175,564	261,870
Malaya	2,762	3,281	125,315	190,958
Ceylon	2,730	2,787	154,166	172,212
British North Borneo	728	79	33,966	5,247
Hongkong	4,232	10,748	162,064	511,297
Australia	21,229	17,694	1,472,860	1,459,063
New Zealand	15,405	14,157	913,387	857,644
Canada	10,150	12,747	641,519	862,709
Jamaica	2,027	946	128,282	64,275
Trinidad	4,504	3,386	300,342	236,704
British Guiana	458	313	29,604	21,858
Other Commonwealth countries	1,653	1,984	103,132	110,973
Eire	5,169	3,887	271,256	222,320
Finland	2,728	6,579	194,302	434,161
Sweden	11,805	7,828	601,633	489,409
Norway	7,299	11,785	275,543	621,655
Denmark	5,040	6,995	311,695	431,978
Western Germany	1,158	3,238	48,717	105,482
Netherlands	7,165	8,826	404,939	582,153
Belgium	1,734	2,152	110,842	149,504
France	242	1,111	35,675	103,509
Switzerland	1,581	1,839	146,269	203,810
Portugal	926	1,501	73,889	122,949
Spain	2,049	1,763	120,887	149,605
Italy	1,411	9,245	97,214	347,720
Austria	592	335	88,375	40,567
Yugoslavia	—	743	30	36,331
Greece	332	511	16,022	39,974
Turkey	255	72	14,255	6,464
Netherlands Antilles	555	748	33,582	74,370
Portuguese East Africa	443	277	30,855	23,443
Egypt	1,820	—	102,840	—
Sudan	2,165	3,264	113,419	196,647
Lebanon	42	159	3,609	12,011
Israel	738	376	54,293	35,074
Saudi Arabia	34	91	5,915	12,094
Iraq	1,181	2,043	92,621	146,671
Iran	5,786	575	326,843	51,319
Burma	473	1,664	38,488	120,518
Thailand	1,498	618	106,842	40,874
Indonesia	1,333	237	64,067	23,739
Philippine Republic	256	122	9,257	4,214
USA	3,477	3,805	267,552	367,000
Cuba	826	354	52,491	23,236
Colombia	311	161	18,385	15,110
Venezuela	5,696	8,669	366,929	620,001
Ecuador	212	328	20,790	31,448
Peru	2,046	821	100,495	55,563
Uruguay	574	575	27,407	39,949
Argentina	4,068	5,454	341,763	407,917
Other foreign countries	1,802	17,488	127,411	931,134
TOTAL	216,964	240,529	12,859,617	15,399,333

Total Imports of Iron and Steel

From	Month ended January 31.		Month ended January 31.	
	1956.	1957.	1956.	1957.
	Tons.	Tons.	£	£
Rhodesia and Nyasaland	—	365	5	64,102
Canada	4,746	3,361	321,694	407,108
Other Commonwealth countries and Eire	464	2,141	33,489	149,256
Soviet Union	54,406	12,853	1,154,811	283,749
Sweden	4,279	3,349	423,166	404,071
Norway	7,939	9,703	540,752	795,252
Western Germany	18,000	10,798	906,959	701,944
Netherlands	12,965	5,376	621,277	247,801
Belgium	39,828	15,067	1,863,891	839,147
Luxembourg	9,573	3,888	465,465	216,358
France	39,093	9,487	2,134,391	783,121
Italy	392	232	23,553	18,634
Austria	21,521	13,851	529,385	411,558
Japan	685	2,604	67,175	201,687
USA	50,303	3,125	2,572,413	421,284
Other foreign countries	6,276	7,194	282,054	473,301
TOTAL	270,470	103,394	11,940,480	6,408,373
Iron and steel scrap and waste, fit only for the recovery of metal	112,844	59,133	2,326,955	1,547,010

Exports of Iron and Steel, by Products

Product.	Month ended January 31.		Month ended January 31.	
	1956.	1957.	1956.	1957.
	Tons.	Tons.	£	£
Pig-iron	7,417	20,352	144,566	498,319
Ferro-columbium (niobium)	11	9	25,023	17,140
Ferro-tungsten	67	111	49,069	80,080
Other ferro-alloys	231	318	67,543	64,545
Ingots, blooms, billets, slabs, sheets, and tinplate bars	290	193	16,092	15,505
Iron bars, and sections	147	181	8,602	13,715
Steel bars, rods, angles, sections, and shapes	30,926	40,447	1,617,272	2,351,337
Iron plates and sheets	41	23	2,956	1,221
Universal plates	479	130	18,356	5,567
Steel plates, ¼ in. and under ⅜ in.	947	1,017	60,175	69,093
Do., ⅜ in. and over	19,637	13,402	747,140	701,081
Blacksheets and blackplate	20,342	28,098	1,411,843	1,909,320
Hoop and strip	8,291	8,441	498,450	622,620
Tinplate	25,485	27,112	1,903,959	2,151,546
Decorated tinplate	198	278	14,133	24,038
Galvanized sheets	12,125	15,263	919,895	1,108,552
Other (incl. tinned sheets, terneplate, and ternesheets)	1,566	1,933	145,441	194,308
Rly: and tramway construction material	24,757	17,899	984,008	818,989
Wire rods	3,264	4,545	116,787	190,998
Wire	7,999	7,695	542,272	598,983
Tubes, pipes, fitg's	52,023	52,184	3,472,352	3,839,570
Iron castings	160	108	13,496	13,603
Steel castings	141	229	25,762	45,233
Forgings	370	561	54,425	63,970
TOTAL	216,964	240,529	12,859,617	15,399,333

PEGLERS, LIMITED—Mr. F. E. PEGLER has ceased to be a director.

ALLEN WEST & COMPANY, LIMITED—Mr. R. M. Malloch has been elected to the board.

DENFORD SMALL TOOLS (BRIGHOUSE), LIMITED—Mr. F. H. Toft has been appointed sales director.

GOODLASS WALL & LEAD INDUSTRIES, LIMITED—Mr. J. L. McConnell has resigned as chairman, having reached retirement age, but he is retaining his seat on the board. Mr. R. L. H. Lancaster has been appointed chairman; Mr. H. S. Tasker has retired from the board.